

Learning Unit 1–1: Reading, Writing, and Rounding Whole Numbers

DRILL PROBLEMS

1. Express the following numbers in verbal form:

a. 8,821 Eight thousand, eight hundred twenty-one

b. 160,501 One hundred sixty thousand, five hundred one

c. 2,098,767 Two million, ninety-eight thousand, seven hundred sixty-seven

d. 58,003 Fifty-eight thousand, three

e. 50,025,212,015 Fifty billion, twenty-five million, two hundred twelve thousand, fifteen
2. Write in numeric form:

a. Eighty thousand, two hundred eighty-one 80,281

b. Fifty-eight thousand, three 58,003

c. Two hundred eighty thousand, five 280,005

d. Three million, ten 3,000,010

e. Sixty-seven thousand, seven hundred sixty 67,760
3. Round the following numbers:

a. To the nearest ten:
76 80 379 380 855 860 5,981 5,980 206 210

b. To the nearest hundred:
9,664 9,700 2,074 2,100 888 900 271 300 75 100

c. To the nearest thousand:
21,486 21,000 621 1,000 3,504 4,000 9,735 10,000
4. Round off each number to the nearest ten, nearest hundred, nearest thousand, and round all the way. (Remember that you are rounding the original number each time.)

	Nearest ten	Nearest hundred	Nearest thousand	Round all the way
a. 4,752	<u>4,750</u>	<u>4,800</u>	<u>5,000</u>	<u>5,000</u>
b. 70,351	<u>70,350</u>	<u>70,400</u>	<u>70,000</u>	<u>70,000</u>
c. 9,386	<u>9,390</u>	<u>9,400</u>	<u>9,000</u>	<u>9,000</u>
d. 4,983	<u>4,980</u>	<u>5,000</u>	<u>5,000</u>	<u>5,000</u>
e. 408,119	<u>408,120</u>	<u>408,100</u>	<u>408,000</u>	<u>400,000</u>
f. 30,051	<u>30,050</u>	<u>30,100</u>	<u>30,000</u>	<u>30,000</u>
5. Name the place position (place value) of the underlined digit.

a. 8,348 hundreds place

b. 9,734 thousands place

c. 347,107 ten thousands place

d. 723 tens place

e. 28,200,000,121 billions place

f. 706,359,005 ten millions place

g. 27,563,530 hundred thousands place

WORD PROBLEMS

6. Gim Smith was shopping for an Apple computer. He went to three different websites and found the computer he wanted at three different prices. At website A the price was \$2,018, at website B the price was \$1,985, and at website C the price was \$2,030. What is the approximate price Gim will have to pay for the computer? Round to the nearest thousand. (Just one price.)
Approximately \$2,000
7. Amy Parker had to write a check at the bookstore when she purchased her books for the new semester. The total cost of the books was \$564. How will she write this amount in verbal form on her check?
Five hundred sixty-four
8. Matt Schaeffer was listening to the news and heard that steel production last week was one million, five hundred eighty-seven thousand tons. Express this amount in numeric form.
1,587,000 tons
9. Jackie Martin is the city clerk and must go to the aldermen's meetings and take notes on what is discussed. At last night's meeting, they were discussing repairs for the public library, which will cost three hundred seventy-five thousand, nine hundred eighty-five dollars. Write this in numeric form as Jackie would.
\$375,985
10. A government survey revealed that 25,963,400 people are employed as office workers. To show the approximate number of office workers, round the number all the way.
30,000,000 office workers
11. Bob Donaldson wished to present his top student with a certificate of achievement at the end of the school year in 2019. To make it appear more official, he wanted to write the year in verbal form. How did he write the year?
Two thousand, nineteen
12. Nancy Morrissey has a problem reading large numbers and determining place value. She asked her brother to name the place value of the 4 in the number 13,542,966. Can you tell Nancy the place value of the 4? What is the place value of the 3?
The 4 is in the **ten thousands** place.
The 3 is in the **millions** place.

Learning Unit 1–2: Adding and Subtracting Whole Numbers

DRILL PROBLEMS

1. Add by totaling each separate column:

a. 668 338 16 9 9 1,006	b. 43 58 96 17 18 197	c. 493 826 9 11 12 1,319	d. 36 76 43 24 19 16 179	e. 716 458 397 139 478 38 25 19 2,188	f. 535 107 778 215 391 26 20 18 2,026	g. 751 378 135 747 368 29 25 21 2,379	h. 75,730 48,531 15,797 8 15 19 18 12 140,058
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2. Estimate by rounding all the way, and then add the actual numbers:

a. 580 971 548 430 506 3,035	600 1,000 500 400 500 3,000	b. 1,470 7,631 4,383 13,484	1,000 8,000 4,000 13,000	c. 475 837 213 775 432 2,732	500 800 200 800 400 2,700
d. 442 609 766 410 128 2,355	400 600 800 400 100 2,300	e. 2,571 3,625 4,091 928 11,215	3,000 4,000 4,000 900 11,900	f. 10,928 9,321 12,654 15,492 48,395	10,000 9,000 10,000 20,000 49,000

3. Estimate by rounding all the way, and then subtract the actual numbers:

$$\begin{array}{r} \text{a. } 90 \quad 90 \\ - 38 \quad - 40 \\ \hline 52 \quad 50 \end{array}$$

$$\begin{array}{r} \text{b. } 91 \quad 90 \\ - 33 \quad - 30 \\ \hline 58 \quad 60 \end{array}$$

$$\begin{array}{r} \text{c. } 68 \quad 70 \\ - 59 \quad - 60 \\ \hline 9 \quad 10 \end{array}$$

$$\begin{array}{r} \text{d. } 981 \quad 1,000 \\ - 283 \quad - 300 \\ \hline 698 \quad 700 \end{array}$$

$$\begin{array}{r} \text{e. } 622 \quad 600 \\ - 328 \quad - 300 \\ \hline 294 \quad 300 \end{array}$$

$$\begin{array}{r} \text{f. } 1,125 \quad 1,000 \\ - 913 \quad - 900 \\ \hline 212 \quad 100 \end{array}$$

4. Subtract and check:

$$\begin{array}{r} \text{a. } 4,947 \quad 585 \\ - 4,362 \quad + 4,362 \\ \hline 585 \quad 4,947 \end{array}$$

$$\begin{array}{r} \text{b. } 3,724 \quad 1,586 \\ - 2,138 \quad + 2,138 \\ \hline 1,586 \quad 3,724 \end{array}$$

$$\begin{array}{r} \text{c. } 474,820 \quad 388,973 \\ - 85,847 \quad + 85,847 \\ \hline 388,973 \quad 474,820 \end{array}$$

$$\begin{array}{r} \text{d. } 50,000 \quad 28,238 \\ - 21,762 \quad + 21,762 \\ \hline 28,238 \quad 50,000 \end{array}$$

$$\begin{array}{r} \text{e. } 65,003 \quad 40,016 \\ - 24,987 \quad + 24,987 \\ \hline 40,016 \quad 65,003 \end{array}$$

$$\begin{array}{r} \text{f. } 15,715 \quad 12,212 \\ - 3,503 \quad + 3,503 \\ \hline 12,212 \quad 15,715 \end{array}$$

5. In the following sales report, total the rows and the columns, and then check that the grand total is the same both horizontally and vertically.

Salesperson	Region 1	Region 2	Region 3	Total
a. Avila	\$ 5,692	\$ 7,403	\$ 3,591	\$16,686
b. Edwards	7,652	7,590	3,021	18,263
c. Graff	6,545	6,738	4,545	17,828
d. Jackson	6,937	6,950	4,913	18,800
e. Total	\$26,826	\$28,681	\$16,070	\$71,577

WORD PROBLEMS

6. June Long owes \$8,600 on her car loan for a new Chevy Volt, plus interest of \$620. How much will it cost her to pay off this loan?
 $\$8,600 + \$620 = \$9,220$
7. Sales at Rich's Convenience Store were \$3,587 on Monday, \$3,944 on Tuesday, \$4,007 on Wednesday, \$3,890 on Thursday, and \$4,545 on Friday. What were the total sales for the week?

$$\begin{array}{r} \$ 3,587 \\ 3,944 \\ 4,007 \\ 3,890 \\ 4,545 \\ \hline \$19,973 \text{ total sales} \end{array}$$

8. Poor's Variety Store sold \$5,000 worth of lottery tickets in the first week of August; it sold \$289 less in the second week. How much were the lottery ticket sales in the second week of August?
 $\$5,000 - \$289 = \$4,711$ in lottery ticket sales

9. A truck weighed 9,550 pounds when it was empty. After being filled with rubbish, it was driven to the dump where it weighed in at 22,347 pounds. How much did the rubbish weigh?
 $22,347 - 9,550 = 12,797$ pounds of rubbish

10. Joanne Hoster had \$610 in her checking account when she went to the bookstore. Joanne purchased an accounting book for \$140, the working papers for \$30, and a study guide for \$35. After Joanne writes a check for the entire purchase, how much money will remain in her checking account?

$$\begin{array}{r} \$140 \\ 30 \\ 35 \\ \hline \$205 \text{ total of purchase} \end{array} \quad \begin{array}{r} \$610 \\ - 205 \\ \hline \$405 \text{ remaining balance} \end{array}$$

11. A used Ford truck is advertised with a base price of \$6,986 delivered. However, the window sticker on the truck reads as follows: tinted glass, \$210; automatic transmission, \$650; power steering, \$210; power brakes, \$215; safety locks, \$95; air conditioning, \$1,056. Estimate the total price, including the accessories, by rounding all the way and *then* calculating the exact price.

\$7,000	\$6,986
200	210
700	650
200	210
200	215
100	95
<u>1,000</u>	<u>1,056</u>
\$9,400	\$9,422

12. Four different stores are offering the same make and model of a Panasonic Smart television:

Store A	Store B	Store C	Store D
\$1,285	\$1,380	\$1,440	\$1,355

Find the difference between the highest price and the lowest price. Check your answer.

Check	
\$1,440	\$ 155
<u>- 1,285</u>	<u>+ 1,285</u>
\$ 155	\$1,440

13. A Xerox copy machine has a suggested retail price of \$1,395. The net price is \$649. How much is the discount on the copy machine?

\$1,395
<u>- 649</u>
\$ 746 discount

Learning Unit 1–3: Multiplying and Dividing Whole Numbers

DRILL PROBLEMS

1. In the following problems, first estimate by rounding all the way, and then work the actual problems and check:

Actual	Estimate	Check
a. $\begin{array}{r} 160 \\ \times 15 \\ \hline 800 \\ 160 \\ \hline 2,400 \end{array}$	$\begin{array}{r} 200 \\ \times 20 \\ \hline 4,000 \end{array}$	$\begin{array}{r} 5 \times 160 = 800 \\ 10 \times 160 = 1,600 \\ \hline 2,400 \end{array}$
b. $\begin{array}{r} 4,216 \\ \times 45 \\ \hline 21,080 \\ 16,864 \\ \hline 189,720 \end{array}$	$\begin{array}{r} 4,000 \\ \times 50 \\ \hline 200,000 \end{array}$	$\begin{array}{r} 5 \times 4,216 = 21,080 \\ 40 \times 4,216 = 168,640 \\ \hline 189,720 \end{array}$
c. $\begin{array}{r} 52,376 \\ \times 309 \\ \hline 471,384 \\ 1,571,280 \\ \hline 16,184,184 \end{array}$	$\begin{array}{r} 50,000 \\ \times 300 \\ \hline 15,000,000 \end{array}$	$\begin{array}{r} 9 \times 52,376 = 471,384 \\ 300 \times 52,376 = 15,712,800 \\ \hline 16,184,184 \end{array}$
d. $\begin{array}{r} 3,106 \\ \times 28 \\ \hline 24,848 \\ 6212 \\ \hline 86,968 \end{array}$	$\begin{array}{r} 3,000 \\ \times 30 \\ \hline 90,000 \end{array}$	$\begin{array}{r} 8 \times 3,106 = 24,848 \\ 20 \times 3,106 = 62,120 \\ \hline 86,968 \end{array}$

2. Multiply; use the shortcut when applicable:

a.
$$\begin{array}{r} 4,072 \\ \times 100 \\ \hline \end{array}$$

$407,200 \quad 1 \times 4,072 + 2 \text{ zeros} = 407,200$

b.
$$\begin{array}{r} 5,100 \\ \times 40 \\ \hline \end{array}$$

$204,000 \quad 4 \times 51 + 3 \text{ zeros} = 204,000$

c.
$$\begin{array}{r} 76,000 \\ \times 1,200 \\ \hline \end{array}$$

$91,200,000 \quad 12 \times 76 + 5 \text{ zeros} = 91,200,000$

d. $93 \times 100,000 = 9,300,000$

$93 \times 1 + 5 \text{ zeros} = 9,300,000$

3. Divide by rounding all the way; then do the actual calculation and check showing the remainder as a whole number.

Actual
a.
$$\begin{array}{r} 963 \text{ R5} \\ 8 \overline{)7,709} \\ \underline{72} \\ 50 \\ \underline{48} \\ 29 \\ \underline{24} \\ 5 \end{array}$$

Estimate
$$\begin{array}{r} 1,000 \\ 8 \overline{)8,000} \end{array}$$

Check
$$\begin{array}{r} 8 \times 963 = 7,704 \\ + 5 \\ \hline 7,709 \end{array}$$

b.
$$\begin{array}{r} 227 \text{ R8} \\ 26 \overline{)5,910} \\ \underline{52} \\ 71 \\ \underline{52} \\ 190 \\ \underline{182} \\ 8 \end{array}$$

$$\begin{array}{r} 200 \\ 30 \overline{)6,000} \end{array}$$

$$\begin{array}{r} 26 \times 227 = 5,902 \\ + 8 \\ \hline 5,910 \end{array}$$

c.
$$\begin{array}{r} 25 \text{ R8} \\ 151 \overline{)3,783} \\ \underline{302} \\ 763 \\ \underline{755} \\ 8 \end{array}$$

$$\begin{array}{r} 20 \\ 200 \overline{)4,000} \end{array}$$

$$\begin{array}{r} 151 \times 25 = 3,775 \\ + 8 \\ \hline 3,783 \end{array}$$

d.
$$\begin{array}{r} 425 \\ 46 \overline{)19,550} \\ \underline{184} \\ 115 \\ \underline{92} \\ 230 \\ \underline{230} \end{array}$$

$$\begin{array}{r} 400 \\ 50 \overline{)20,000} \end{array}$$

$46 \times 425 = 19,550$

4. Divide by the shortcut method:

a.
$$\begin{array}{r} 27 \\ 200 \overline{)5,400} \end{array}$$

Drop 2 zeros: $54 \div 2 = 27$

b.
$$\begin{array}{r} 113 \\ 50 \overline{)5,650} \end{array}$$

Drop 1 zero: $565 \div 5 = 113$

c.
$$\begin{array}{r} 36 \\ 1,200 \overline{)43,200} \end{array}$$

Drop 2 zeros: $432 \div 12 = 36$

d.
$$\begin{array}{r} 30 \\ 17,000 \overline{)510,000} \end{array}$$

Drop 3 zeros: $510 \div 17 = 30$

WORD PROBLEMS

5. Mia Kaminsky sells state lottery tickets in her variety store. If Mia's Variety Store sells 720 lottery tickets per day, how many tickets will be sold in a 7-day period?

$720 \times 7 = 5,040 \text{ lottery tickets}$

6. Arlex Oil Company employs 100 people who are eligible for profit sharing. The financial manager has announced that the profits to be shared amount to \$64,000. How much will each employee receive?

$\$64,000 \div 100 = \640 per employee

7. John Duncan's employer withheld \$4,056 in federal taxes from his pay for the year. If equal deductions are made each week, what is John's weekly deduction?
 $\$4,056 \div 52 = \78 weekly withholding
8. Anne Domingoes drives a Volvo that gets 32 miles per gallon of gasoline. How many miles can she travel on 25 gallons of gas?
 $32 \times 25 = 800$ miles
9. How many 8-inch pieces of yellow ribbon can be cut from a spool of ribbon that contains 6 yards (1 yard = 36 inches)?
 $6 \times 36 = 216$ total inches of ribbon $216 \div 8 = 27$ pieces of ribbon
10. The number of commercials aired per day on a local television station is 672. How many commercials are aired in 1 year?
 $672 \times 365 = 245,280$ commercials per year
11. The computer department at City College purchased 18 computers at a cost of \$2,400 each. What was the total price for the computer purchase?
 $\$2,400 \times 18 = \$43,200$ total price
12. Net income for Goodwin's Partnership was \$64,500. The five partners share profits and losses equally. What was each partner's share?
 $\$64,500 \div 5 = \$12,900$ per partner
13. Ethan Ying's supervisor at the construction site told Ethan to divide a load of 1,423 bricks into stacks containing 35 bricks each. How many stacks will there be when Ethan has finished the job? How many "extra" bricks will there be?
- $$\begin{array}{r} 40 \text{ R}23 \\ 35 \overline{)1,423} \\ \underline{1\ 40} \\ 23 \end{array}$$
- 40 stacks, and 23 "extra" bricks

Learning Unit 2–1: Types of Fractions and Conversion Procedures

DRILL PROBLEMS

1. Identify the type of fraction—proper, improper, or mixed number:

a. $\frac{9}{8}$ Improper	b. $\frac{7}{9}$ Proper	c. $\frac{29}{27}$ Improper
d. $9\frac{3}{11}$ Mixed number	e. $\frac{18}{5}$ Improper	f. $9\frac{1}{8}$ Mixed number

2. Convert to a mixed number:

a. $\frac{29}{4} = 7\frac{1}{4}$	b. $\frac{137}{8} = 17\frac{1}{8}$	c. $\frac{27}{5} = 5\frac{2}{5}$
d. $\frac{29}{9} = 3\frac{2}{9}$	e. $\frac{71}{8} = 8\frac{7}{8}$	f. $\frac{43}{6} = 7\frac{1}{6}$

3. Convert the mixed number to an improper fraction:

a. $9\frac{1}{5} = \frac{(5 \times 9) + 1}{5} = \frac{46}{5}$	b. $12\frac{3}{11} = \frac{(11 \times 12) + 3}{11} = \frac{135}{11}$	c. $4\frac{3}{7} = \frac{(7 \times 4) + 3}{7} = \frac{31}{7}$
d. $20\frac{4}{9} = \frac{(9 \times 20) + 4}{9} = \frac{184}{9}$	e. $10\frac{11}{12} = \frac{(12 \times 10) + 11}{12} = \frac{131}{12}$	f. $17\frac{2}{3} = \frac{(3 \times 17) + 2}{3} = \frac{53}{3}$

4. Tell whether the fractions in each pair are equivalent or not:

- a. $\frac{3}{4}$ $\frac{9}{12}$ Yes b. $\frac{2}{3}$ $\frac{12}{18}$ Yes c. $\frac{7}{8}$ $\frac{15}{16}$ No
 d. $\frac{4}{5}$ $\frac{12}{15}$ Yes e. $\frac{3}{2}$ $\frac{9}{4}$ No f. $\frac{5}{8}$ $\frac{7}{11}$ No
 g. $\frac{7}{12}$ $\frac{7}{24}$ No h. $\frac{5}{4}$ $\frac{30}{24}$ Yes i. $\frac{10}{26}$ $\frac{12}{26}$ No

5. Find the greatest common divisor by the step approach and reduce to lowest terms:

- a. $\frac{36}{42}$ $\begin{array}{r} 1 \\ 36 \overline{)42} \\ \underline{36} \\ 6 \end{array}$ $\begin{array}{r} 6 \\ 6 \overline{)36} \\ \underline{36} \\ 0 \end{array}$ $\frac{36 \div 6}{42 \div 6} = \frac{6}{7}$
 b. $\frac{30}{75}$ $\begin{array}{r} 2 \\ 30 \overline{)75} \\ \underline{60} \\ 15 \end{array}$ $\begin{array}{r} 2 \\ 15 \overline{)30} \\ \underline{30} \\ 0 \end{array}$ $\frac{30 \div 15}{75 \div 15} = \frac{2}{5}$
 c. $\frac{74}{148}$ $\begin{array}{r} 2 \\ 74 \overline{)148} \\ \underline{148} \\ 0 \end{array}$ $\frac{74 \div 74}{148 \div 74} = \frac{1}{2}$
 d. $\frac{15}{600}$ $\begin{array}{r} 40 \\ 15 \overline{)600} \\ \underline{60} \\ 00 \end{array}$ $\frac{15 \div 15}{600 \div 15} = \frac{1}{40}$
 e. $\frac{96}{132}$ $\begin{array}{r} 1 \\ 96 \overline{)132} \\ \underline{96} \\ 36 \end{array}$ $\begin{array}{r} 2 \\ 36 \overline{)96} \\ \underline{72} \\ 24 \end{array}$ $\begin{array}{r} 1 \\ 24 \overline{)36} \\ \underline{24} \\ 12 \end{array}$ $\begin{array}{r} 2 \\ 12 \overline{)24} \\ \underline{24} \\ 0 \end{array}$ $\frac{96 \div 12}{132 \div 12} = \frac{8}{11}$
 f. $\frac{84}{154}$ $\begin{array}{r} 1 \\ 84 \overline{)154} \\ \underline{84} \\ 70 \end{array}$ $\begin{array}{r} 1 \\ 70 \overline{)84} \\ \underline{70} \\ 14 \end{array}$ $\begin{array}{r} 1 \\ 14 \overline{)70} \\ \underline{70} \\ 0 \end{array}$ $\frac{84 \div 14}{154 \div 14} = \frac{6}{11}$

6. Convert to higher terms:

- a. $\frac{9}{10} = \frac{\quad}{70}$ $\begin{array}{r} 7 \\ 10 \overline{)70} \end{array}$ $7 \times 9 = 63$ $\frac{9}{10} = \frac{63}{70}$
 b. $\frac{2}{15} = \frac{\quad}{30}$ $\begin{array}{r} 2 \\ 15 \overline{)30} \end{array}$ $2 \times 2 = 4$ $\frac{2}{15} = \frac{4}{30}$
 c. $\frac{6}{11} = \frac{\quad}{132}$ $\begin{array}{r} 12 \\ 11 \overline{)132} \end{array}$ $12 \times 6 = 72$ $\frac{6}{11} = \frac{72}{132}$
 d. $\frac{4}{9} = \frac{\quad}{36}$ $\begin{array}{r} 4 \\ 9 \overline{)36} \end{array}$ $4 \times 4 = 16$ $\frac{4}{9} = \frac{16}{36}$
 e. $\frac{7}{20} = \frac{\quad}{100}$ $\begin{array}{r} 5 \\ 20 \overline{)100} \end{array}$ $7 \times 5 = 35$ $\frac{7}{20} = \frac{35}{100}$
 f. $\frac{7}{8} = \frac{\quad}{560}$ $\begin{array}{r} 70 \\ 8 \overline{)560} \end{array}$ $7 \times 70 = 490$ $\frac{7}{8} = \frac{490}{560}$

WORD PROBLEMS

7. Ken drove to college in $3\frac{1}{4}$ hours. How many quarter-hours is that? Show your answer as an improper fraction.

$$3\frac{1}{4} = \frac{(4 \times 3) + 1}{4} = \frac{13}{4} \text{ hours}$$

8. Mary looked in the refrigerator for a dozen eggs. When she found the box, only 5 eggs were left. What fractional part of the box of eggs was left?

$$\frac{5}{12} \text{ of the box}$$

9. At a recent meeting of a local Boosters Club, 17 of the 25 members attending were men. What fraction of those in attendance were men?

$$\frac{17}{25} \text{ men}$$

10. By weight, water is two parts out of three parts of the human body. What fraction of the body is water?

$$\frac{2}{3} \text{ of the body is water}$$

11. Three out of 5 students who begin college will continue until they receive their degree. Show in fractional form how many out of 100 beginning students will graduate.

$$\frac{3}{5} = \frac{60}{100}$$

12. Tina and her friends came in late to a party and found only $\frac{3}{4}$ of a pizza remaining. In order for everyone to get some pizza, she wanted to divide it into smaller pieces. If she divides the pizza into twelfths, how many pieces will she have? Show your answer in fractional form.

$$\frac{3}{4} = \frac{9}{12}$$

13. Sharon and Spunky noted that it took them 35 minutes to do their exercise routine. What fractional part of an hour is that? Show your answer in lowest terms.

$$\frac{35}{60} = \frac{35 \div 5}{60 \div 5} = \frac{7}{12}$$

14. Norman and his friend ordered several pizzas, which were all cut into eighths. The group ate 43 pieces of pizza. How many pizzas did they eat? Show your answer as a mixed number.

$$\frac{43}{8} = 5\frac{3}{8}$$

$$\begin{array}{r} 5R3 \\ 8 \overline{)43} \\ \underline{40} \\ 3 \end{array}$$

Learning Unit 2–2: Adding and Subtracting Fractions

DRILL PROBLEMS

1. Find the least common denominator (LCD) for each of the following groups of denominators using the prime numbers:

a. 8, 16, 32

$$\begin{array}{r} 2 \overline{)8} \quad 2 \overline{)16} \quad 2 \overline{)32} \\ 2 \overline{)4} \quad 2 \overline{)8} \quad 2 \overline{)16} \\ 2 \overline{)2} \quad 2 \overline{)4} \quad 2 \overline{)8} \\ 2 \overline{)1} \quad 2 \overline{)2} \quad 2 \overline{)4} \\ 1 \quad 1 \quad 2 \\ 2 \times 2 \times 2 \times 2 \times 1 \times 1 \times 2 = 32 \end{array}$$

b. 9, 15, 20

$$\begin{array}{r} 3 \overline{)9} \quad 3 \overline{)15} \quad 2 \overline{)20} \\ 5 \overline{)3} \quad 5 \overline{)5} \quad 2 \overline{)10} \\ 3 \quad 1 \quad 4 \\ 3 \times 5 \times 3 \times 1 \times 4 = 180 \end{array}$$

c. 12, 15, 32

$$\begin{array}{r} 2 \overline{)12} \quad 3 \overline{)15} \quad 2 \overline{)32} \\ 2 \overline{)6} \quad 3 \overline{)5} \quad 2 \overline{)16} \\ 3 \overline{)3} \quad 3 \overline{)15} \quad 2 \overline{)8} \\ 1 \quad 5 \quad 8 \\ 2 \times 2 \times 3 \times 1 \times 5 \times 8 = 480 \end{array}$$

d. 7, 9, 14, 28

$$\begin{array}{r} 2 \overline{)7} \quad 3 \overline{)9} \quad 2 \overline{)14} \quad 2 \overline{)28} \\ 7 \overline{)7} \quad 3 \overline{)3} \quad 2 \overline{)7} \quad 2 \overline{)14} \\ 1 \quad 9 \quad 1 \quad 2 \\ 2 \times 7 \times 1 \times 9 \times 1 \times 2 = 252 \end{array}$$

2. Add and reduce to lowest terms or change to a mixed number if needed:

a. $\frac{1}{9} + \frac{4}{9} = \frac{5}{9}$

b. $\frac{5}{12} + \frac{8}{15} = \frac{25}{60} + \frac{32}{60} = \frac{57}{60} = \frac{19}{20}$

$$\frac{5}{12} = \frac{?}{60} = \frac{25}{60} \quad \frac{8}{15} = \frac{?}{60} = \frac{32}{60}$$

$$\begin{aligned} \text{c. } \frac{7}{8} + \frac{5}{12} &= 1\frac{7}{24} = \frac{31}{24} = 24 \overline{)31} \text{ 1 R } 7 = 1\frac{7}{24} \\ \frac{21}{24} + \frac{10}{24} &= \frac{31}{24} \\ \frac{7}{8} = \frac{?}{24} = \frac{21}{24} \quad \frac{5}{12} = \frac{?}{24} = \frac{10}{24} \end{aligned}$$

$$\begin{aligned} \text{d. } 7\frac{2}{3} + 5\frac{1}{4} &= 12\frac{11}{12} \\ \frac{2}{3} = \frac{?}{12} = \frac{8}{12} & \quad \frac{7\frac{2}{3}}{3} \quad \frac{7\frac{8}{12}}{12} \\ \frac{1}{4} = \frac{?}{12} = \frac{3}{12} & \quad +5\frac{1}{4} \quad +5\frac{3}{2} \\ & \quad \frac{12\frac{11}{12}}{12} \end{aligned}$$

$$\begin{aligned} \text{e. } \frac{2}{3} + \frac{4}{9} + \frac{1}{4} &= 1\frac{13}{36} = 1\frac{13}{36} \\ \frac{2}{3} = \frac{?}{36} = \frac{24}{36} & \quad \frac{4}{9} = \frac{?}{36} = \frac{16}{36} \\ \frac{1}{4} = \frac{?}{36} = \frac{9}{36} & \quad \frac{1}{4} = \frac{?}{36} = \frac{9}{36} \end{aligned}$$

3. Subtract and reduce to lowest terms:

$$\begin{aligned} \text{a. } \frac{5}{9} - \frac{2}{9} &= \frac{3}{9} = \frac{1}{3} & \text{b. } \frac{14}{15} - \frac{4}{15} &= \frac{10}{15} = \frac{2}{3} & \text{c. } \frac{8}{9} - \frac{5}{6} &= \frac{1}{18} \\ \frac{16}{18} - \frac{15}{18} &= \frac{1}{18} & \text{d. } \frac{7}{12} - \frac{9}{16} &= \frac{1}{48} \\ \frac{28}{48} - \frac{27}{48} &= \frac{1}{48} \end{aligned}$$

$$\begin{aligned} \text{e. } 33\frac{5}{8} - 27\frac{1}{2} &= 6\frac{1}{8} & \text{f. } 9 - 2\frac{3}{7} &= 6\frac{4}{7} \\ 33\frac{5}{8} & \quad 33\frac{5}{8} & 9 & \quad 8\frac{7}{7} \\ -27\frac{1}{2} & \quad -27\frac{4}{8} & -2\frac{3}{7} & \quad -2\frac{3}{7} \\ \hline & \quad 6\frac{1}{8} & \hline & \quad 6\frac{4}{7} & \hline \end{aligned}$$

$$\begin{aligned} \text{g. } 15\frac{1}{3} - 9\frac{7}{12} &= 5\frac{3}{4} \\ 15\frac{1}{3} & \quad 15\frac{4}{12} & 14\frac{16}{12} \\ -9\frac{7}{12} & \quad -9\frac{7}{12} & -9\frac{7}{12} \\ \hline & \quad 5\frac{9}{12} = 5\frac{3}{4} & \hline \end{aligned}$$

$$\begin{aligned} \text{h. } 92\frac{3}{10} - 35\frac{7}{15} &= 56\frac{5}{6} & \text{i. } 93 - 57\frac{5}{12} &= 35\frac{7}{12} \\ 92\frac{3}{10} & \quad 92\frac{9}{30} & 93 & \quad 92\frac{12}{12} \\ -35\frac{7}{15} & \quad -35\frac{14}{30} & -57\frac{5}{12} & \quad -57\frac{5}{12} \\ \hline & \quad 56\frac{25}{30} = 56\frac{5}{6} & \hline & \quad 35\frac{7}{12} & \hline \end{aligned}$$

$$\begin{aligned} \text{j. } 22\frac{5}{8} - 17\frac{1}{4} &= 5\frac{3}{8} \\ 22\frac{5}{8} & \quad 22\frac{5}{8} \\ -17\frac{1}{4} & \quad -17\frac{2}{8} \\ \hline & \quad 5\frac{3}{8} & \hline \end{aligned}$$

WORD PROBLEMS

4. Dan Lund took a cross-country trip. He drove $5\frac{3}{8}$ hours on Monday, $6\frac{1}{2}$ hours on Tuesday, $9\frac{3}{4}$ hours on Wednesday, $6\frac{3}{8}$ hours on Thursday, and $10\frac{1}{4}$ hours on Friday. Find the total number of hours Dan drove in the first 5 days of his trip.

$$\begin{aligned} & \begin{array}{r} 5\frac{3}{8} \\ 6\frac{1}{2} \\ 9\frac{3}{4} \\ 6\frac{3}{8} \\ +10\frac{1}{4} \\ \hline \end{array} & \begin{array}{r} 5\frac{3}{8} \\ 6\frac{4}{8} \\ 9\frac{6}{8} \\ 6\frac{3}{8} \\ +10\frac{2}{8} \\ \hline \end{array} \\ & 36\frac{18}{8} = 36 + 2\frac{2}{8} = 38\frac{2}{8} = 38\frac{1}{4} \text{ hours driven} \end{aligned}$$

5. Sharon Parker bought 20 yards of material to make curtains. She used $4\frac{1}{2}$ yards for one bedroom window, $8\frac{3}{5}$ yards for another bedroom window, and $3\frac{7}{8}$ yards for a hall window. How much material did she have left?

$$\begin{array}{r}
 4\frac{1}{2} \\
 8\frac{3}{5} \\
 +3\frac{7}{8} \\
 \hline
 \end{array}
 \quad
 \begin{array}{r}
 4\frac{20}{40} \\
 8\frac{24}{40} \\
 +3\frac{35}{40} \\
 \hline
 15\frac{79}{40}
 \end{array}
 = 15 + 1\frac{39}{40} = 16\frac{39}{40} \text{ material used}$$

$$\begin{array}{r}
 20 \\
 -16\frac{39}{40} \\
 \hline
 3\frac{1}{40} \text{ yards of material left}
 \end{array}$$

6. Molly Ring visited a local gym and lost $2\frac{1}{4}$ pounds the first weekend and $6\frac{1}{8}$ pounds in week 2. What is Molly's total weight loss?

$$\begin{array}{r}
 2\frac{1}{4} \\
 +6\frac{1}{8} \\
 \hline
 8\frac{3}{8} \text{ pounds}
 \end{array}$$

7. Bill Williams had to drive $46\frac{1}{4}$ miles to work. After driving $28\frac{5}{6}$ miles he noticed he was low on gas and had to decide whether he should stop to fill the gas tank. How many more miles does Bill have to drive to get to work?

$$\begin{array}{r}
 46\frac{1}{4} \\
 -28\frac{5}{6} \\
 \hline
 17\frac{5}{12} \text{ miles remaining}
 \end{array}$$

8. Albert's Lumber Yard purchased $52\frac{1}{2}$ cords of lumber on Monday and $48\frac{3}{4}$ cords on Tuesday. It sold $21\frac{3}{8}$ cords on Friday. How many cords of lumber remain at Albert's Lumber Yard?

$$\begin{array}{r}
 52\frac{1}{2} \\
 +48\frac{3}{4} \\
 \hline
 100\frac{5}{4} = 101\frac{1}{4} \text{ cords purchased}
 \end{array}$$

$$\begin{array}{r}
 101\frac{1}{4} \\
 -21\frac{3}{8} \\
 \hline
 79\frac{7}{8} \text{ cords remain}
 \end{array}$$

9. At Arlen Oil Company, where Dave Bursett is the service manager, it took $42\frac{1}{3}$ hours to clean five boilers. After a new cleaning tool was purchased, the time for cleaning five boilers was reduced to $37\frac{4}{9}$ hours. How much time was saved?

$$\begin{array}{r}
 42\frac{1}{3} \\
 -37\frac{4}{9} \\
 \hline
 4\frac{8}{9} \text{ hours saved}
 \end{array}$$

Learning Unit 2–3: Multiplying and Dividing Fractions

DRILL PROBLEMS

1. Multiply; use the cancellation technique:

a. $\frac{6}{13} \times \frac{26}{12} = \frac{\cancel{6}^2}{\cancel{13}_1} \times \frac{\cancel{26}^1}{\cancel{12}_2} = 1$

b. $\frac{3}{8} \times \frac{2}{3} = \frac{\cancel{3}^1}{8} \times \frac{\cancel{2}_1}{\cancel{3}_1} = \frac{1}{4}$

c. $\frac{5}{7} \times \frac{9}{10} = \frac{\cancel{9}^3}{7} \times \frac{\cancel{10}_2}{\cancel{5}_1} = \frac{3}{14}$

d. $\frac{3}{4} \times \frac{9}{13} \times \frac{26}{27} = \frac{\cancel{3}^1}{4} \times \frac{\cancel{9}^3}{\cancel{13}_1} \times \frac{\cancel{26}^1}{\cancel{27}_3} = \frac{1}{2}$

$$\text{e. } 6\frac{2}{5} \times 3\frac{1}{8} = 20$$

$$\frac{\overset{4}{\cancel{32}}}{\underset{1}{\cancel{8}}} \times \frac{\overset{5}{\cancel{25}}}{\underset{1}{\cancel{8}}} = \frac{20}{1} = 20$$

$$\text{g. } 45 \times \frac{7}{9} = 35$$

$$\overset{5}{\cancel{45}} \times \frac{7}{\underset{1}{\cancel{9}}} = 35$$

$$\text{i. } \frac{3}{4} \times \frac{7}{9} \times 3\frac{1}{3} = 1\frac{17}{18}$$

$$\frac{\overset{1}{\cancel{3}}}{\underset{2}{\cancel{4}}} \times \frac{7}{9} \times \frac{\overset{5}{\cancel{10}}}{\underset{1}{\cancel{3}}} = \frac{35}{18} = 1\frac{17}{18}$$

$$\text{f. } 2\frac{2}{3} \times 2\frac{7}{10} = 7\frac{1}{5}$$

$$\frac{\overset{4}{\cancel{8}}}{\underset{1}{\cancel{3}}} \times \frac{\overset{9}{\cancel{27}}}{\underset{5}{\cancel{10}}} = \frac{36}{5} = 7\frac{1}{5}$$

$$\text{h. } 3\frac{1}{9} \times 1\frac{2}{7} \times \frac{3}{4} = 3$$

$$\overset{1}{\cancel{28}} \times \frac{\overset{1}{\cancel{9}}}{\underset{1}{\cancel{7}}} \times \frac{3}{\underset{1}{\cancel{4}}} = 3$$

$$\text{j. } \frac{1}{8} \times 6\frac{2}{3} \times \frac{1}{10} = \frac{1}{12}$$

$$\frac{1}{\underset{4}{\cancel{8}}} \times \frac{\overset{1}{\cancel{20}}}{\underset{3}{\cancel{3}}} \times \frac{1}{\underset{1}{\cancel{10}}} = \frac{1}{12}$$

2. Multiply; do not use canceling but reduce by finding the greatest common divisor:

$$\text{a. } \frac{3}{4} \times \frac{8}{9} = \frac{24 \div 12}{36 \div 12} = \frac{2}{3}$$

$$\begin{array}{r} 1 \quad 2 \\ 24 \overline{)36} \quad 12 \overline{)24} \\ \underline{24} \quad \underline{24} \\ 12 \quad 0 \end{array}$$

$$\text{b. } \frac{7}{16} \times \frac{8}{13} = \frac{56 \div 8}{208 \div 8} = \frac{7}{26}$$

$$\begin{array}{r} 3 \quad 1 \quad 2 \quad 2 \\ 56 \overline{)208} \quad 40 \overline{)56} \quad 16 \overline{)40} \quad 8 \overline{)16} \\ \underline{168} \quad \underline{40} \quad \underline{32} \quad \underline{16} \\ 40 \quad 16 \quad 8 \quad 0 \end{array}$$

3. Multiply or divide as indicated:

$$\text{a. } \frac{25}{36} \div \frac{5}{9} = \frac{\overset{5}{\cancel{25}}}{\underset{4}{\cancel{36}}} \times \frac{\overset{1}{\cancel{9}}}{\underset{1}{\cancel{5}}} = \frac{5}{4} = 1\frac{1}{4}$$

$$\text{b. } \frac{18}{8} \div \frac{12}{16} = \frac{\overset{3}{\cancel{18}}}{\underset{1}{\cancel{8}}} \times \frac{\overset{2}{\cancel{16}}}{\underset{1}{\cancel{12}}} = 3$$

$$\text{c. } 2\frac{6}{7} \div 2\frac{2}{5} = 1\frac{4}{21}$$

$$\frac{20}{7} \div \frac{12}{5} = \frac{\overset{5}{\cancel{20}}}{\underset{7}{\cancel{12}}} \times \frac{\underset{3}{\cancel{5}}}{\underset{1}{\cancel{4}}} = \frac{25}{21} = 1\frac{4}{21}$$

$$\text{d. } 3\frac{1}{4} \div 16 = \frac{13}{64}$$

$$\frac{13}{4} \div \frac{16}{1} = \frac{13}{4} \times \frac{1}{16} = \frac{13}{64}$$

$$\text{e. } 24 \div 1\frac{1}{3} = 18$$

$$\frac{24}{1} \div \frac{4}{3} = \frac{\overset{6}{\cancel{24}}}{\underset{1}{\cancel{1}}} \times \frac{\underset{1}{\cancel{3}}}{\underset{1}{\cancel{4}}} = 18$$

$$\text{f. } 6 \times \frac{3}{2} = 9$$

$$\overset{3}{\cancel{6}} \times \frac{3}{\underset{1}{\cancel{2}}} = 9$$

$$\text{g. } 3\frac{1}{5} \times 7\frac{1}{2} = 24$$

$$\frac{\overset{8}{\cancel{16}}}{\underset{1}{\cancel{5}}} \times \frac{\overset{3}{\cancel{15}}}{\underset{1}{\cancel{2}}} = 24$$

$$\text{h. } \frac{3}{8} \div \frac{7}{4} = \frac{3}{14}$$

$$\frac{\underset{2}{\cancel{3}}}{\underset{8}{\cancel{4}}} \times \frac{\overset{1}{\cancel{4}}}{\underset{1}{\cancel{7}}} = \frac{3}{14}$$

$$\text{i. } 9 \div 3\frac{3}{4} = 2\frac{2}{5}$$

$$\frac{9}{1} \div \frac{15}{4} = \frac{\overset{3}{\cancel{9}}}{\underset{1}{\cancel{1}}} \times \frac{\underset{5}{\cancel{4}}}{\underset{1}{\cancel{15}}} = \frac{12}{5} = 2\frac{2}{5}$$

$$\text{j. } \frac{11}{24} \times \frac{24}{33} = \frac{1}{3}$$

$$\frac{\overset{1}{\cancel{11}}}{\underset{1}{\cancel{24}}} \times \frac{\overset{1}{\cancel{24}}}{\underset{3}{\cancel{33}}} = \frac{1}{3}$$

$$\text{k. } \frac{12}{14} \div 27 = \frac{2}{63}$$

$$\frac{12}{14} \div \frac{27}{1} = \frac{\overset{2}{\cancel{12}}}{\underset{7}{\cancel{14}}} \times \frac{\underset{9}{\cancel{1}}}{\underset{1}{\cancel{27}}} = \frac{2}{63}$$

$$\text{l. } \frac{3}{5} \times \frac{2}{7} \times \frac{3}{10} = \frac{4}{7}$$

$$\frac{\underset{1}{\cancel{3}}}{\underset{5}{\cancel{2}}} \times \frac{\underset{1}{\cancel{2}}}{\underset{1}{\cancel{7}}} \times \frac{\overset{2}{\cancel{10}}}{\underset{1}{\cancel{5}}} = \frac{4}{7}$$

WORD PROBLEMS

4. Monique Coleman plans to make 12 meatloafs to store in her freezer. Each meatloaf requires $2\frac{1}{4}$ pounds of ground beef. How much ground beef does Monique need?

$$12 \times 2\frac{1}{4} = \cancel{12}^3 \times \frac{9}{\cancel{4}_1} = 27 \text{ pounds}$$

5. Judy Carter purchased a real estate lot for \$24,000. She sold it 2 years later for $1\frac{5}{8}$ times as much as she had paid for it. What was the selling price?

$$\$24,000 \times 1\frac{5}{8} = \cancel{\$24,000}^{\$3,000} \times \frac{13}{\cancel{8}_1} = \$39,000$$

6. Lynn Clarkson saw an ad for a camcorder that cost \$980. She knew of a discount store that would sell it to her for a markdown of $\frac{3}{20}$ off the advertised price. How much is the discount she can get?

$$\cancel{\$980}^{\$49} \times \frac{3}{\cancel{20}_1} = \$147 \text{ discount}$$

7. To raise money for their club, the members of the Marketing Club purchased 68 bushels of popcorn to resell. They plan to repack the popcorn in bags that hold $\frac{2}{21}$ of a bushel each. How many bags of popcorn will they be able to fill?

$$68 \div \frac{2}{21} = \cancel{68}^{34} \times \frac{21}{\cancel{2}_1} = 714 \text{ bags}$$

8. Richard Tracy paid a total of \$375 for lumber costing $\$9\frac{3}{8}$ per foot. How many feet did he purchase?

$$\$375 \div \$9\frac{3}{8} = 375 \div \frac{75}{8} = \cancel{375}^5 \times \frac{8}{\cancel{75}_1} = 40 \text{ feet}$$

9. While training for a marathon, Kristin Woods jogged $7\frac{3}{4}$ miles per hour for $2\frac{2}{3}$ hours. How many miles did Kristin jog?

$$7\frac{3}{4} \times 2\frac{2}{3} = \frac{31}{\cancel{4}_1} \times \frac{\cancel{8}^2}{3} = \frac{62}{3} = 20\frac{2}{3} \text{ miles}$$

10. On a map, 1 inch represents 240 miles. How many miles are represented by $\frac{3}{8}$ of an inch?

$$\cancel{240}^{30} \times \frac{3}{\cancel{8}_1} = 90 \text{ miles}$$

11. In Massachusetts, the governor wants to allot $\frac{1}{6}$ of the total sales tax collections to public education. The total sales tax collected is \$2,472,000; how much will go to education?

$$\cancel{\$2,472,000}^{\$412,000} \times \frac{1}{\cancel{6}_1} = \$412,000 \text{ to education}$$

Learning Unit 3–1: Rounding Decimals; Fraction and Decimal Conversions

DRILL PROBLEMS

1. Write in decimal:

- a. Sixty-two hundredths .62
- b. Six tenths .6
- c. Nine hundred fifty-three thousandths .953
- d. Four hundred one thousandths .401
- e. Six hundredths .06

2. Round each decimal to the place indicated:

- a. .8624 to the nearest thousandth .862
- b. .051 to the nearest tenth .1
- c. 8.207 to the nearest hundredth 8.21
- d. 2.094 to the nearest hundredth 2.09
- e. .511172 to the nearest ten thousandth .5112

3. Name the place position of the underlined digit:

a. $.8\text{26}$ Hundredths place

b. $.91\text{4}$ Thousandths place

c. 3.1169 Tenths place

d. 53.175 Thousandths place

e. 1.0174 Ten thousandths place

4. Convert to fractions (do not reduce):

a. $.91 = \frac{91}{100}$

b. $.426 = \frac{426}{1,000}$

c. $2.516 = 2\frac{516}{1,000}$

d. $.62\frac{1}{2} = \frac{625}{1,000}$

e. $13.007 = 13\frac{7}{1,000}$

f. $5.03\frac{1}{4} = 5\frac{325}{10,000}$

5. Convert to fractions and reduce to lowest terms:

a. $.4 = \frac{4}{10} = \frac{2}{5}$

b. $.44 = \frac{44}{100} = \frac{11}{25}$

c. $.53 = \frac{53}{100}$

d. $.336 = \frac{336}{1,000} = \frac{42}{125}$

e. $.096 = \frac{96}{1,000} = \frac{12}{125}$

f. $.125 = \frac{125}{1,000} = \frac{1}{8}$

g. $.3125 = \frac{3,125}{10,000} = \frac{5}{16}$

h. $.008 = \frac{8}{1,000} = \frac{1}{125}$

i. $2.625 = 2\frac{625}{1,000} = 2\frac{5}{8}$

j. $5.75 = 5\frac{75}{100} = 5\frac{3}{4}$

k. $3.375 = 3\frac{375}{1,000} = 3\frac{3}{8}$

l. $9.04 = 9\frac{4}{100} = 9\frac{1}{25}$

6. Convert the following fractions to decimals and round your answer to the nearest hundredth:

a. $\frac{1}{8} = .125 = .13$

b. $\frac{7}{16} = .4375 = .44$

c. $\frac{2}{3} = .6666 = .67$

d. $\frac{3}{4} = .75$

e. $\frac{9}{16} = .5625 = .56$

f. $\frac{5}{6} = .8333 = .83$

g. $\frac{7}{9} = .7777 = .78$

h. $\frac{38}{79} = .4810 = .48$

i. $2\frac{3}{8} = 2 + .375 = 2.38$

j. $9\frac{1}{3} = 9 + .3333 = 9.33$

k. $11\frac{19}{50} = 11 + .38 = 11.38$

l. $6\frac{21}{32} = 6 + .6562 = 6.66$

m. $4\frac{83}{97} = 4 + .8556 = 4.86$

n. $1\frac{2}{5} = 1 + .40 = 1.40$

o. $2\frac{2}{11} = 2 + .1818 = 2.18$

p. $13\frac{30}{42} = 13 + .7142 = 13.71$

WORD PROBLEMS

7. Alan Angel got 2 hits in his first 7 times at bat. What is his average to the nearest thousandths place?

$\frac{2}{7} = .2857 = .286$

8. Bill Breen earned \$1,555, and his employer calculated that Bill's total FICA deduction should be \$118.9575. Round this deduction to the nearest cent.

$\$118.9575 = \118.96

9. At the local college, .566 of the students are men. Convert to a fraction. Do not reduce.

$$.566 = \frac{566}{1,000}$$

10. The average television set is watched 2,400 hours a year. If there are 8,760 hours in a year, what fractional part of the year is spent watching television? Reduce to lowest terms.

$$\frac{24,00}{8,760} = \frac{20}{73}$$

11. On Saturday, the employees at the Empire Fish Company work only $\frac{1}{3}$ of a day. How could this be expressed as a decimal to the nearest thousandth?

$$\frac{1}{3} = .333$$

12. The North Shore Cinema has 610 seats. At a recent film screening there were 55 vacant seats. Show as a fraction the number of filled seats. Reduce as needed.

$$\frac{610}{-55} = \frac{555}{555}$$

$$\frac{555}{610} = \frac{111}{122}$$

13. Yasser Ahmed was planning his marketing strategy for a new product his company had produced. He was fascinated to discover that Rhode Island, the smallest state in the United States, was only twenty thousand, five hundred seven ten millionths the size of the largest state, Alaska. Write this number in decimal.

$$.0020507$$

14. Bull Moose Company purchased a new manufacturing plant, located on an acre of land, for a total price of \$2,250,000. The accountant determined that $\frac{3}{7}$ of the total price should be allocated as the price of the building. What decimal portion is the price of the building? Round to the nearest thousandth.

$$\frac{3}{7} = .4285 = .429$$

Learning Unit 3–2: Adding, Subtracting, Multiplying, and Dividing Decimals

DRILL PROBLEMS

1. Add:

a. $7.57 + 6.2 + 13.008 + 4.83$

$$\begin{array}{r} 7.570 \\ 6.200 \\ 13.008 \\ +4.830 \\ \hline 31.608 \end{array}$$

b. $1.0625 + 4.0881 + .0775$

$$\begin{array}{r} 1.0625 \\ 4.0881 \\ +.0775 \\ \hline 5.2281 \end{array}$$

c. $.903 + .078 + .17 + .1 + .96$

$$\begin{array}{r} .903 \\ .078 \\ .170 \\ .100 \\ +.960 \\ \hline 2.211 \end{array}$$

d. $3.38 + .175 + .0186 + .2$

$$\begin{array}{r} 3.3800 \\ .1750 \\ .0186 \\ +.2000 \\ \hline 3.7736 \end{array}$$

2. Rearrange and subtract:

a. $.96 - .43$

$$\begin{array}{r} .96 \\ -.43 \\ \hline .53 \end{array}$$

b. $.885 - .069$

$$\begin{array}{r} .885 \\ -.069 \\ \hline .816 \end{array}$$

c. $11.67 - .935$

$$\begin{array}{r} 11.670 \\ - .935 \\ \hline 10.735 \end{array}$$

d. $261.2 - 8.08$

$$\begin{array}{r} 261.20 \\ - 8.08 \\ \hline 253.12 \end{array}$$

3. Multiply and round to the nearest tenth:

a. $13.6 \times .02$

$$\begin{array}{r} 13.6 \\ \times .02 \\ \hline .272 = .3 \end{array}$$

b. $1.73 \times .069$

$$\begin{array}{r} 1.73 \\ \times .069 \\ \hline 1557 \\ 1038 \\ \hline .11937 = .1 \end{array}$$

c. 400×3.7

$$\begin{array}{r} 400 \\ \times 3.7 \\ \hline 2800 \\ 1200 \\ \hline 1,480 = 1,480.0 \end{array}$$

d. 0.025×5.6

$$\begin{array}{r} 0.025 \\ \times 5.6 \\ \hline 150 \\ 125 \\ \hline .1400 = .1 \end{array}$$

4. Divide and round to the nearest hundredth:

a. $13.869 \div .6$

$$\begin{array}{r} 23.115 = 23.12 \\ .6 \overline{)13.8690} \\ \underline{6} \\ 18 \\ \underline{18} \\ 06 \\ \underline{6} \\ 09 \\ \underline{6} \\ 30 \\ \underline{30} \end{array}$$

b. $1.0088 \div .14$

$$\begin{array}{r} 7.205 = 7.21 \\ .14 \overline{)1.00880} \\ \underline{.14} \\ 88 \\ \underline{84} \\ 40 \\ \underline{42} \\ 80 \\ \underline{70} \end{array}$$

c. $18.7 \div 2.16$

$$\begin{array}{r} 8.657 = 8.66 \\ 2.16 \overline{)18.70000} \\ \underline{4.32} \\ 17.28 \\ \underline{4.32} \\ 1.420 \\ \underline{4.32} \\ 1.296 \\ \underline{1.296} \\ 1240 \\ \underline{1080} \\ 1600 \\ \underline{1512} \end{array}$$

d. $15.64 \div .34$

$$\begin{array}{r} 46. = 46.00 \\ .34 \overline{)15.64} \\ \underline{102} \\ 544 \\ \underline{510} \\ 340 \\ \underline{340} \end{array}$$

5. Complete by the shortcut method:

a. $6.87 \times 1,000 = 6,870$

b. $927,530 \div 100 = 9,275.3$

c. $27.2 \div 1,000 = .0272$

d. $.21 \times 1,000 = 210$

e. $347 \times 100 = 34,700$

f. $347 \div 100 = 3.47$

g. $.0021 \div 10 = .00021$

h. $85.44 \times 10,000 = 854,400$

i. $83.298 \times 100 = 8,329.8$

j. $23.0109 \div 100 = .230109$

WORD PROBLEMS (Use *Business Math Handbook* Tables as Needed.)

6. Andy Hay noted his Ford Explorer odometer reading of 18,969.4 at the beginning of his vacation. At the end of his vacation the reading was 21,510.4. How many miles did he drive during his vacation?

$$\begin{array}{r} 21,510.4 \\ - 18,969.4 \\ \hline 2,541.0 \text{ miles} \end{array}$$

7. Jeanne Allyn purchased 12.25 yards of ribbon for a craft project. The ribbon cost 37¢ per yard. What was the total cost of the ribbon?

$$\begin{array}{r} 12.25 \\ \times \$.37 \\ \hline 8575 \\ 3675 \\ \hline \$4.5325 = \$4.53 \end{array}$$

8. Leo Green wanted to find out the gas mileage for his company truck. When he filled the gas tank, he wrote down the odometer reading of 9,650.7. The next time he filled the gas tank the odometer reading was 10,112.2. He looked at the gas pump and saw that he had taken 18.5 gallons of gas. Find the gas mileage per gallon for Leo's truck. Round to the nearest tenth.

$$\begin{array}{r} 10,112.2 \\ - 9,650.7 \\ \hline 461.5 \text{ miles traveled} \end{array}$$

$$\begin{array}{r} 24.94 = 24.9 \text{ mpg} \\ 18.5 \overline{)461.500} \\ \underline{370} \\ 915 \\ \underline{740} \\ 1750 \\ \underline{1665} \\ 850 \\ \underline{740} \end{array}$$

9. At Halley's Rent-a-Car, the cost per day to rent a medium-size car is \$35.25 plus 37¢ a mile. What would be the charge to rent this car for 1 day if you drove 205.4 miles?

$$\begin{array}{r}
 205.4 \\
 \times \$.37 \\
 \hline
 14378 \\
 6162 \\
 \hline
 \$75.998 = \$76.00
 \end{array}
 \qquad
 \begin{array}{r}
 \$ 76.00 \\
 + 35.25 \\
 \hline
 \$111.25 \text{ charge}
 \end{array}$$

10. A trip to Mexico costs 6,000 pesos. What is this in U.S. dollars? Check your answer.

$$\begin{array}{l}
 6,000 \times \$.0556 = \$333.60 \\
 \$33.60 \times 17.6566 = \$5,890 \text{ due to rounding}
 \end{array}$$

11. If a commemorative gold coin weighs 7.842 grams, find the number of coins that can be produced from 116 grams of gold. Round to the nearest whole number.

$$\begin{array}{r}
 14.7 = 15 \text{ coins} \\
 7.842 \overline{)116.0000} \\
 \underline{78 \ 42} \\
 37 \ 580 \\
 \underline{31 \ 368} \\
 6 \ 2120 \\
 \underline{5 \ 4894} \\
 7226
 \end{array}$$

Learning Unit 4–1: The Checking Account

DRILL PROBLEMS

1. The following is a deposit slip made out by Fred Young of the F. W. Young Company.

- a. How much cash did Young deposit? \$430.64
- b. How many checks did Young deposit? 3
- c. What was the total amount deposited? \$867.51

 Fleet Bank Checking Deposit TO THE ACCOUNT OF _____ DATE <u>3/27/XX</u>		This deposit is subject to: proof and verification, the Uniform Commercial Code, the collection and availability policy of this bank.																																																																			
NAME (PLEASE PRINT) _____ PLEASE ENDORSE ALL CHECKS _____ PLEASE ENTER CLEARLY YOUR ACCOUNT NUMBER _____		<table border="1"> <thead> <tr> <th>DESCRIPTION</th> <th>DOLLARS</th> <th>CENTS</th> </tr> </thead> <tbody> <tr> <td>BILLS</td> <td>415</td> <td>XX</td> </tr> <tr> <td>COIN</td> <td>15</td> <td>64</td> </tr> <tr> <td>1. LIST CHECKS 53-1297</td> <td>188</td> <td>44</td> </tr> <tr> <td>2. 51-1509</td> <td>98</td> <td>37</td> </tr> <tr> <td>3. 53-1290</td> <td>150</td> <td>06</td> </tr> <tr> <td>4.</td> <td></td> <td></td> </tr> <tr> <td>5.</td> <td></td> <td></td> </tr> <tr> <td>6.</td> <td></td> <td></td> </tr> <tr> <td>SUB TOTAL ITEMS 1-6</td> <td></td> <td></td> </tr> </tbody> </table>	DESCRIPTION	DOLLARS	CENTS	BILLS	415	XX	COIN	15	64	1. LIST CHECKS 53-1297	188	44	2. 51-1509	98	37	3. 53-1290	150	06	4.			5.			6.			SUB TOTAL ITEMS 1-6			<table border="1"> <thead> <tr> <th colspan="3">ADDITIONAL CHECKS</th> </tr> <tr> <th>DESCRIPTION</th> <th>DOLLARS</th> <th>CENTS</th> </tr> </thead> <tbody> <tr><td>7.</td><td></td><td></td></tr> <tr><td>8.</td><td></td><td></td></tr> <tr><td>9.</td><td></td><td></td></tr> <tr><td>10.</td><td></td><td></td></tr> <tr><td>11.</td><td></td><td></td></tr> <tr><td>12.</td><td></td><td></td></tr> <tr><td>13.</td><td></td><td></td></tr> <tr><td>14.</td><td></td><td></td></tr> <tr> <td>SUB TOTAL ITEMS 7-14</td> <td></td> <td></td> </tr> <tr> <td>TOTAL</td> <td></td> <td></td> </tr> </tbody> </table>	ADDITIONAL CHECKS			DESCRIPTION	DOLLARS	CENTS	7.			8.			9.			10.			11.			12.			13.			14.			SUB TOTAL ITEMS 7-14			TOTAL		
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2. Blackstone Company had a balance of \$2,173.18 in its checking account. Henry James, Blackstone's accountant, made a deposit that consisted of 2 fifty-dollar bills, 120 ten-dollar bills, 6 five-dollar bills, 14 one-dollar bills, \$9.54 in change, plus two checks the company had accepted, one for \$16.38 and the other for \$102.50. Find the amount of the deposit and the new balance in Blackstone's checking account.

$$\begin{array}{r}
 \$ 100.00 \\
 1,200.00 \\
 30.00 \\
 14.00 \\
 9.54 \\
 16.38 \\
 + 102.50 \\
 \hline
 \$1,472.42 \text{ deposit}
 \end{array}
 \qquad
 \begin{array}{r}
 \$2,173.18 \\
 + 1,472.42 \\
 \hline
 \$3,645.60 \text{ new balance}
 \end{array}$$

3. Answer the following questions using the illustration:

No. <u>113</u> \$ <u>750⁰⁰/₁₀₀</u> <u>October 4</u> 20 <u>XX</u> To <u>Neuner Realty</u> For <u>real estate</u>	No. 113 October 4 20 XX 5-13/110 \$ <u>750⁰⁰/₁₀₀</u> DOLLARS Fleet Bank FLEET BANK OF MASSACHUSETTS, NATIONAL ASSOCIATION BOSTON, MASSACHUSETTS <u>Kevin Jones</u> MEMO <u>real estate</u> <u>A011000138A</u> <u>14</u> <u>0380</u> <u>113</u>																		
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 15%;"></th> <th style="width: 15%;">DOLLARS</th> <th style="width: 15%;">CENTS</th> </tr> <tr> <td>BALANCE</td> <td><u>1,020</u></td> <td><u>93</u></td> </tr> <tr> <td>AMT. DEPOSITED</td> <td><u>2,756</u></td> <td><u>80</u></td> </tr> <tr> <td>TOTAL</td> <td><u>3,777</u></td> <td><u>73</u></td> </tr> <tr> <td>AMT. THIS CHECK</td> <td><u>750</u></td> <td><u>00</u></td> </tr> <tr> <td>BALANCE FORWARD</td> <td><u>3,027</u></td> <td><u>73</u></td> </tr> </table>		DOLLARS	CENTS	BALANCE	<u>1,020</u>	<u>93</u>	AMT. DEPOSITED	<u>2,756</u>	<u>80</u>	TOTAL	<u>3,777</u>	<u>73</u>	AMT. THIS CHECK	<u>750</u>	<u>00</u>	BALANCE FORWARD	<u>3,027</u>	<u>73</u>	
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- a. Who is the payee? Neuner Realty Company
 - b. Who is the drawer? Kevin Jones
 - c. Who is the drawee? Fleet Bank
 - d. What is the bank's identification number 5-13/110
 - e. What is Jones Company's account number? 14 0380
 - f. What was the balance in the account on September 30? \$1,020.93
 - g. For how much did Jones write Check No. 113? \$750.00
 - h. How much was deposited on October 1? \$2,756.80
 - i. How much was left after Check No. 113 was written? \$3,027.73
4. Write each of the following amounts in verbal form as you would on a check:
- a. \$40 Forty and XX/100 ----- DOLLARS
 - b. \$245.75 Two hundred forty-five and 75/100 ----- DOLLARS
 - c. \$3.98 Three and 98/100----- DOLLARS
 - d. \$1,205.05 One thousand, two hundred five and 05/100----- DOLLARS
 - e. \$3,013 Three thousand, thirteen and XX/100----- DOLLARS
 - f. \$510.10 Five hundred ten and 10/100 ----- DOLLARS

Learning Unit 4–2: Bank Statement and Reconciliation Process; Using Mobile and Online Banking

WORD PROBLEMS

1. Find the bank balance on January 31.

Date	Checks and payments			Deposits	Balance
January 1					401.17
January 2	108.64				<u>292.53</u>
January 5	116.50			432.16	<u>608.19</u>
January 6	14.92	150.00	10.00		<u>433.27</u>
January 11	12.29			633.89	<u>1,054.87</u>
January 18	108.64	18.60			<u>927.63</u>
January 25	43.91	23.77		657.22	<u>1,517.17</u>
January 26	75.00				<u>1,442.17</u>
January 31	6.75	sc			<u>1,435.42</u>

2. Joe Madruga, of Madruga's Taxi Service, received a bank statement for the month of May showing a balance of \$932.36. His records show that the bank had not yet recorded two of his deposits, one for \$521.50 and the other for \$98.46. There are outstanding checks in the amounts of \$41.67, \$135.18, and \$25.30. The statement also shows a service charge of \$3.38. The balance in the check register is \$1,353.55. Prepare a bank reconciliation for Madruga's as of May 31.

Madruga's Taxi Service Bank Reconciliation as of May 31, 20XX			
Checkbook balance		Bank statement balance	
Checkbook balance	\$1,353.55	Bank statement balance	\$ 932.36
Less: Service charge	3.38	Add: Deposits in transit	521.50
			98.46
			\$1,552.32
		Less: Outstanding checks	4 1.67
			135. 18
			25.30
Reconciled balance	<u>\$ 1,350.17</u>	Reconciled balance	<u>\$ 1,350.17</u>

3. In reconciling the checking account for Nasser Enterprises, Beth Accomando found that the bank had collected a \$3,000 promissory note on the company's behalf and had charged a \$15 collection fee. There was also a service charge of \$7.25. What amount should be added/subtracted from the checkbook balance to bring it up to date?

Add: <u>\$3,000</u>	Deduct: <u>\$22.25</u>
	\$15.00 collection fee
	<u>7.25</u> service fee
	<u>\$22.25</u>

4. In reconciling the checking account for Colonial Cleaners, Steve Papa found that a check for \$34.50 had been recorded in the check register as \$43.50. The bank returned an NSF check in the amount of \$62.55. Interest income of \$8.25 was earned and a service charge of \$10.32 was assessed. What amount should be added/subtracted from the checkbook balance to bring it up to date?

Add:	<u>\$17.25</u>	Deduct:	<u>\$72.87</u>
	\$ 9.00 recording error		\$62.55 returned check
	<u>8.25</u> interest earned		<u>10.32</u> service charge
	\$17.25		\$72.87

5. Matthew Stokes was completing the bank reconciliation for Parker's Tool and Die Company. The check register balance was \$1,503.67. Matthew found that a \$76.00 check had been recorded in the check register as \$67.00; that a note for \$1,500 had been collected by the bank for Parker's and the collection fee was \$12.00; that \$15.60 interest was earned on the account; and that an \$8.35 service charge had been assessed. What should the check register balance be after Matthew updates it with the bank reconciliation information?

\$1,503.67 beginning balance	\$1,500.00 note	\$ 9.00 error
+1,515.60	<u>15.60</u> interest	12.00 fee
<u>- 29.35</u>	\$1,515.60 (add)	<u>8.35</u> service charge
\$2,989.92 ending balance		\$29.35 (deduct)

6. Consumers, community activists, and politicians are decrying the new line of accounts because several include a \$3 service charge for some customers who use bank tellers for transactions that can be done through an automated teller machine. Bill Wade banks at a local bank that charges this fee. He was having difficulty balancing his checkbook because he did not notice this fee on his bank statement. His bank statement showed a balance of \$822.18. Bill's checkbook had a balance of \$206.48. Check No. 406 for \$116.08 and Check No. 407 for \$12.50 were outstanding. A \$521 deposit was not on the statement. Bill has his payroll check electronically deposited to his checking account—the payroll check was for \$1,015.12. (Bill's payroll checks vary each month.) There are also a \$1 service fee and a teller fee of \$6. Complete Bill's bank reconciliation.

Checkbook balance	\$ 206.48	Bank statement balance	\$ 822.18
Direct deposit	+1,015.12	Check No. 406	– 116.08
Teller fee	– 6.00	Check No. 407	– 12.50
Service charge	<u>– 1.00</u>	Deposit in transit	<u>+ 521.00</u>
Reconciled balance	\$1,214.60	Reconciled balance	\$1,214.60

7. At First National Bank in San Diego, some customers have to pay \$25 each year as an ATM card fee. John Levi banks at First National Bank and just received his bank statement showing a balance of \$829.25; his checkbook balance is \$467.40. The bank statement shows an ATM card fee of \$25.00, teller fee of \$9.00, interest of \$1.80, and John's \$880 IRS refund check, which was processed by the IRS and deposited to his account. John has two checks that have not cleared—No. 112 for \$620.10 and No. 113 for \$206.05. There is also a deposit in transit for \$1,312.10. Prepare John's bank reconciliation.

Checkbook balance	\$ 467.40	Bank statement balance	\$ 829.25
ATM card fee	– 25.00	Check No. 112	– 620.10
Teller fee	– 9.00	Check No. 113	– 206.05
Interest	+ 1.80	Deposit in transit	+1,312.10
IRS refund	+ 880.00	Reconciled balance	<u>\$ 1,315.20</u>
Reconciled balance	<u>\$1,315.20</u>		

Learning Unit 5–1: Solving Equations for the Unknown

DRILL PROBLEMS

1. Write equations for the following situations. Use N for the unknown number. Do not solve the equations.

- Four times a number is 180. $4N = 180$
- A number increased by 13 equals 25. $N + 13 = 25$
- Seven less than a number is 5. $N - 7 = 5$
- Fifty-seven decreased by 3 times a number is 21. $57 - 3N = 21$
- Fourteen added to one-third of a number is 18.
 $14 + \frac{N}{3} = 18$
- Twice the sum of a number and 4 is 32.
 $2(N + 4) = 32$
- Three-fourths of a number is 9.
 $\frac{3}{4}N = 9$
- Two times a number plus 3 times the same number plus 8 is 68.
 $2N + 3N + 8 = 68$

2. Solve for the unknown number:

- $C + 40 = 90$
 $\begin{array}{r} -40 \\ C = 50 \end{array}$
- $29 + M = 44$
 $\begin{array}{r} -29 \\ M = 15 \end{array}$
- $D - 77 = 98$
 $\begin{array}{r} +77 \\ D = 175 \end{array}$
- $7N = 63$
 $\begin{array}{r} 7N = 63 \\ \frac{7N}{7} = \frac{63}{7} \\ N = 9 \end{array}$
- $\frac{X}{12} = 11$
 $\begin{array}{r} (12)\frac{X}{12} = 11(12) \\ X = 132 \end{array}$
- $3Q + 4Q + 2Q = 108$
 $\begin{array}{r} 9Q = 108 \\ \frac{9Q}{9} = \frac{108}{9} \\ Q = 12 \end{array}$
- $H + 5H + 3 = 57$
 $\begin{array}{r} 6H + 3 = 57 \\ -3 \quad -3 \\ \hline 6H = 54 \\ \frac{6H}{6} = \frac{54}{6} \\ H = 9 \end{array}$
- $2(N - 3) = 62$
 $\begin{array}{r} 2N - 6 = 62 \\ +6 \quad +6 \\ \hline 2N = 68 \\ \frac{2N}{2} = \frac{68}{2} \\ N = 34 \end{array}$
- $\frac{3R}{4} = 27$
 $\begin{array}{r} 4\left(\frac{3R}{4}\right) = 27(4) \\ \frac{3R}{1} = \frac{108}{3} \\ R = 36 \end{array}$
- $E - 32 = 41$
 $\begin{array}{r} +32 \quad +32 \\ E = 73 \end{array}$
- $5(2T - 2) = 120$
 $\begin{array}{r} 10T - 10 = 120 \\ +10 \quad +10 \\ \hline 10T = 130 \\ \frac{10T}{10} = \frac{130}{10} \\ T = 13 \end{array}$
- $12W - 5W = 98$
 $\begin{array}{r} 7W = 98 \\ \frac{7W}{7} = \frac{98}{7} \\ W = 14 \end{array}$

$$\begin{array}{rcl}
 \text{m. } 49 - X & = & 37 \\
 \quad \quad \quad \underline{+ X} & & \underline{+ X} \\
 49 & = & 37 + X \\
 \underline{- 37} & & \underline{- 37} \\
 12 & = & X
 \end{array}$$

$$\begin{array}{rcl}
 \text{n. } 12(V + 2) & = & 84 \\
 12V + 24 & = & 84 \\
 \quad \quad \quad \underline{- 24} & & \underline{- 24} \\
 12V & = & 60 \\
 \quad \quad \quad \underline{12} & & \underline{12} \\
 V & = & 5
 \end{array}$$

$$\begin{array}{rcl}
 \text{o. } 7D + 4 & = & 5D + 14 \\
 \quad \quad \quad \underline{- 5D} & & \underline{- 5D} \\
 2D + 4 & = & 14 \\
 \quad \quad \quad \underline{- 4} & & \underline{- 4} \\
 2D & = & 10 \\
 \quad \quad \quad \underline{2} & & \underline{2} \\
 D & = & 5
 \end{array}$$

$$\begin{array}{rcl}
 \text{p. } 7(T - 2) & = & 2T - 9 \\
 7T - 14 & = & 2T - 9 \\
 \underline{- 2T} & & \underline{- 2T} \\
 5T - 14 & = & -9 \\
 \quad \quad \quad \underline{+ 14} & & \underline{+ 14} \\
 5T & = & 5 \\
 \quad \quad \quad \underline{5} & & \underline{5} \\
 T & = & 1
 \end{array}$$

Learning Unit 5-2: Solving Word Problems for the Unknown

WORD PROBLEMS

1. A sweater at the Gap was marked down \$30. The sale price was \$50. What was the original price?

Unknown(s)	Variable(s)	Relationship
Original price	P	$P - \$30 = \text{Sale price}$ Sale price = \$50

$$\begin{array}{rcl}
 P - \$30 & = & \$50 \\
 \quad \quad \quad \underline{+ 30} & = & \underline{+ 30} \\
 P & = & \$80 \text{ original price of sweater}
 \end{array}$$

2. Goodwin's Corporation found that $\frac{2}{3}$ of its employees were vested in their retirement plan. If 124 employees are vested, what is the total number of employees at Goodwin's?

Unknown(s)	Variable(s)	Relationship
Total number of employees	E	$\frac{2}{3}E = \text{Vested employees}$ Vested employees = 124

$$\begin{array}{rcl}
 \frac{2}{3}E & = & 124 \\
 \times \left(\frac{3}{2} \right) & = & 124(3) \\
 \frac{2E}{2} & = & \frac{372}{2} \\
 E & = & 186 \text{ employees}
 \end{array}$$

3. Eileen Haskin's utility and telephone bills for the month totaled \$180. The utility bill was 3 times as much as the telephone bill. How much was each bill?

Unknown(s)	Variable(s)	Relationship
Telephone bill	B	$B + 3B = \text{Total bill}$
Utility bill	$3B$	Total bill = \$180

$$\begin{array}{rcl}
 B + 3B & = & \$180 \\
 \frac{4B}{4} & = & \frac{\$180}{4} \\
 B & = & \$45 = \text{telephone bill; } 3B = \$135 \text{ utility bill}
 \end{array}$$

4. Ryan and his friends went to the golf course to hunt for golf balls. Ryan found 15 more than $\frac{1}{3}$ of the total number of golf balls that were found. How many golf balls were found if Ryan found 75 golf balls?

Unknown(s)	Variable(s)	Relationship
Total golf balls found	G	$\frac{1}{3}G + 15 = \text{Ryan found}$ Ryan found = 75

$$\begin{array}{rcl}
 \frac{1}{3}G + 15 & = & 75 \\
 \quad \quad \quad \underline{- 15} & = & \underline{- 15} \\
 \times \left(\frac{3}{3} \right) & = & 60(3) \\
 G & = & 180 \text{ total golf balls found}
 \end{array}$$

5. Linda Mills and Kylie Chung sold 459 tickets for the Advertising Club's raffle. If Linda sold 8 times as many tickets as Kylie, how many tickets did each one sell?

Unknown(s)	Variable(s)	Relationship
Linda	$8T$	$8T + T = \text{Total tickets}$
Sherry	T	Total tickets = 459

$$8T + T = 459$$

$$\frac{9T}{9} = \frac{459}{9}$$

$$T = 51 \text{ tickets Sherry sold}$$

$$8 \times 51 = 408 \text{ tickets Linda sold}$$

6. Jason Mazzola wanted to buy a suit at Giblee's. Jason did not have enough money with him, so Mr. Giblee told him he would hold the suit if Jason gave him a deposit of $\frac{1}{5}$ of the cost of the suit. Jason agreed and gave Mr. Giblee \$79. What was the price of the suit?

Unknown(s)	Variable(s)	Relationship
Price of suit	$\square$	$\frac{1}{5}\square = \text{Jason's payment}$ Jason's payment = \$79

$$\frac{1}{5}S = \$79$$

$$\cancel{5}\left(\frac{S}{\cancel{5}}\right) = 79(5)$$

$$S = \$395 \text{ price of suit}$$

7. Peter sold watches (\$7) and necklaces (\$4) at a flea market. Total sales were \$300. People bought 3 times as many watches as necklaces. How many of each did Peter sell? What were the total dollar sales of each?

Unknown(s)	Variable(s)	Price	Relationship
Watches	$3\square$	\$7	$21\square$
Necklaces	$\square$	4	$+ 4\square$ \$300

$$21N + 4N = 300$$

$$\frac{25N}{25} = \frac{300}{25}$$

$$N = 12$$

$$12(\$4) + 36(\$7) = \$300$$

$$\$48 + \$252 = \$300$$

$$\$300 = \$300$$

12 necklaces
36 watches

8. Peter sold watches (\$7) and necklaces (\$4) at a flea market. Total sales for 48 watches and necklaces were \$300. How many of each did Peter sell? What were the total dollar sales of each?

Unknown(s)	Variable(s)	Price	Relationship
Watches	$\square$	\$7	$7\square$
Necklaces	$48 - \square$	4	$+ 4(48 - \square)$ \$300

$$7W + 4(48 - W) = 300$$

$$7W + 192 - 4W = 300$$

$$3W + 192 = 300$$

$$\frac{-192}{-192} \quad \frac{-192}{-192}$$

$$\frac{3W}{3} = \frac{108}{3}$$

$$W = 36$$

$$36(\$7) + 12(\$4) = \$300$$

$$\$252 + \$48 = \$300$$

$$\$300 = \$300$$

36 watches
 $48 - 36 = 12$ necklaces

9. A 3,000 piece of direct mailing cost \$1,435. Printing cost is \$550, about $3\frac{1}{2}$ times the cost of typesetting. How much did the typesetting cost? Round to the nearest cent.

Unknown(s)	Variable(s)	Relationship
Typesetting cost	$\square$	Printing cost = \$550 $\times 3\frac{1}{2}C$ = Typesetting cost

$$3\frac{1}{2}C = \$550$$

$$\frac{\cancel{3}\frac{1}{2}C}{\cancel{3}\frac{1}{2}} = \frac{\$550}{3\frac{1}{2}}$$

$$C = \$157.1428 = \$157.14$$

10. In 2019, Tony Rigato, owner of MRM, saw an increase in sales to \$13.5 million. Rigato states that since 2018, sales have more than tripled. What were his sales in 2018?

Unknown(s)	Variable(s)	Relationship
2018 sales	$\square$	$3\square = \$13.5$

$$3S = \$13.5 \text{ million}$$

$$\frac{\cancel{3}S}{\cancel{3}} = \frac{\$13.5}{3}$$

$$S = \$4.5 \text{ million}$$

Learning Unit 6–1: Conversions

DRILL PROBLEMS

1. Convert the following to percents; round to the nearest tenth of a percent if needed:

- | | | | | | | | | |
|----------|-------------|---|----------|-------------|---|-----------|--------------|---|
| a. .08 | <u>8</u> | % | b. .729 | <u>72.9</u> | % | c. .009 | <u>.9</u> | % |
| d. 8.3 | <u>830</u> | % | e. 5.26 | <u>526</u> | % | f. 6 | <u>600</u> | % |
| g. .0105 | <u>1.1</u> | % | h. .1180 | <u>11.8</u> | % | i. 5.0375 | <u>503.8</u> | % |
| j. .862 | <u>86.2</u> | % | k. .2615 | <u>26.2</u> | % | l. .8 | <u>80</u> | % |
| m. .025 | <u>2.5</u> | % | n. .06 | <u>6</u> | % | | | |

2. Convert the following to decimals; do not round:

- | | | | | | | | | |
|--------------------|--------------|--|----------|---------------|--|----------------------|--------------|--|
| a. 68% | <u>.68</u> | | b. .09% | <u>.0009</u> | | c. 4.7% | <u>.047</u> | |
| d. 9.67% | <u>.0967</u> | | e. .2% | <u>.002</u> | | f. $\frac{1}{4}\%$ | <u>.0025</u> | |
| g. .76% | <u>.0076</u> | | h. 110% | <u>1.1</u> | | i. $12\frac{1}{2}\%$ | <u>.125</u> | |
| j. 5% | <u>.05</u> | | k. .004% | <u>.00004</u> | | l. $7\frac{5}{10}\%$ | <u>.075</u> | |
| m. $\frac{3}{4}\%$ | <u>.0075</u> | | n. 1% | <u>.01</u> | | | | |

3. Convert the following to percents; round to the nearest tenth of a percent if needed:

- | | | | | | | | | |
|-------------------|-------------|---|--------------------|-------------|---|---------------------|--------------|---|
| a. $\frac{7}{10}$ | <u>70</u> | % | b. $\frac{1}{5}$ | <u>20</u> | % | c. $1\frac{5}{8}$ | <u>162.5</u> | % |
| d. $\frac{2}{7}$ | <u>28.6</u> | % | e. 2 | <u>200</u> | % | f. $\frac{14}{100}$ | <u>14</u> | % |
| g. $\frac{1}{6}$ | <u>16.7</u> | % | h. $\frac{1}{2}$ | <u>50</u> | % | i. $\frac{3}{5}$ | <u>60</u> | % |
| j. $\frac{3}{25}$ | <u>12</u> | % | k. $\frac{5}{16}$ | <u>31.3</u> | % | l. $\frac{11}{50}$ | <u>22</u> | % |
| m. $4\frac{3}{4}$ | <u>475</u> | % | n. $\frac{3}{200}$ | <u>1.5</u> | % | | | |

4. Convert the following to fractions in simplest form:

- | | | | | | | | | |
|----------------------|-----------------------------------|--|----------------------|------------------------------------|--|----------------------|------------------------------------|--|
| a. 40% | <u>$\frac{2}{5}$</u> | | b. 15% | <u>$\frac{3}{20}$</u> | | c. 50% | <u>$\frac{1}{2}$</u> | |
| d. 75% | <u>$\frac{3}{4}$</u> | | e. 35% | <u>$\frac{7}{20}$</u> | | f. 85% | <u>$\frac{17}{20}$</u> | |
| g. $12\frac{1}{2}\%$ | <u>$\frac{1}{8}$</u> | | h. $37\frac{1}{2}\%$ | <u>$\frac{3}{8}$</u> | | i. $33\frac{1}{3}\%$ | <u>$\frac{1}{3}$</u> | |
| j. 3% | <u>$\frac{3}{100}$</u> | | k. 8.5% | <u>$\frac{17}{200}$</u> | | l. $5\frac{3}{4}\%$ | <u>$\frac{23}{400}$</u> | |
| m. 100% | <u>1</u> | | n. 10% | <u>$\frac{1}{10}$</u> | | | | |

5. Complete the following table by finding the missing fraction, decimal, or percent equivalent:

Fraction	Decimal	Percent	Fraction	Decimal	Percent
a. $\frac{1}{4}$	.25	25%	h. $\frac{1}{6}$	.166	$16\frac{2}{3}\%$
b. $\frac{3}{8}$	.375	$37\frac{1}{2}\%$	i. $\frac{1}{12}$	.0833	$8\frac{1}{3}\%$
c. $\frac{1}{2}$	.5	50%	j. $\frac{1}{9}$	.111	$11\frac{1}{9}\%$
d. $\frac{2}{3}$	.666	$66\frac{2}{3}\%$	k. $\frac{5}{16}$	.3125	$31\frac{1}{4}\%$
e. $\frac{2}{5}$	.4	40%	l. $\frac{3}{40}$	.075	$7\frac{1}{2}\%$
f. $\frac{3}{5}$	.6	60%	m. $\frac{1}{5}$	.20	20%
g. $\frac{7}{10}$	.7	70%	n. $\frac{1}{8}$	1.125	$112\frac{1}{2}\%$

WORD PROBLEMS

6. If Mutual of New York reported that 80% of its new sales came from existing clients, what fractional part of its new sales came from existing clients? Reduce to simplest form.

$$80\% = \frac{80}{100} = \frac{8}{10} = \frac{4}{5}$$

7. Six hundred ninety corporations and design firms competed for the Industrial Design Excellence Award (IDEA). Twenty were selected as the year's best and received gold awards. Show the gold award winners as a fraction; then show what percent of the entrants received gold awards. Round to the nearest tenth of a percent.

$$\frac{20}{690} = \frac{2}{69} \quad .0289 = 2.9\%$$

$$\begin{array}{r} 138 \\ 69 \overline{)2.0000} \\ \underline{620} \\ 552 \\ \underline{680} \\ 621 \\ \underline{59} \end{array}$$

8. If stock prices in the Standard & Poor's 500 stock index rose 4.1%, show the increase as a decimal.
9. In the recent banking crisis, many banks were unable to cover their bad loans. Citicorp, the nation's largest real estate lender, was reported as having only enough reserves to cover 39% of its bad loans. What fractional part of its loan losses was covered?

$$39\% = \frac{39}{100}$$

10. Dave Mattera spent his vacation in Las Vegas. He ordered breakfast in his room, and when he went downstairs to the coffee shop, he discovered that the same breakfast was much less expensive. He had paid 1.884 times as much for the breakfast in his room. What was the percent of increase for the breakfast in his room?

$$1.884 = 188.4\%$$

11. Putnam Management Company of Boston recently increased its management fee by .09%. What is the increase as a decimal? What is the same increase as a fraction?

$$.09\% = .0009 \quad .09\% = .0009 = \frac{9}{10,000}$$

12. John Seyoum and Aurelia Jimenez formed a partnership and drew up a partnership agreement, with profits and losses to be divided equally after each partner receives a $7\frac{1}{2}\%$ return on his or her capital contribution. Show their return on investment as a decimal and as a fraction. Reduce.

$$7\frac{1}{2}\% = 7.5\% = .075 \quad 7\frac{1}{2}\% = 7.5\% = .075 = \frac{75}{1,000} = \frac{3}{40}$$

Learning Unit 6–2: Application of Percents—Portion Formula

DRILL PROBLEMS

1. Fill in the amount of the base, rate, and portion in each of the following statements:

- a. The Patels spend \$4,000 a month on food, which is 30% of their monthly income of \$20,000.
Base \$20,000 Rate 30% Portion \$4,000
- b. Rocky Norman got a \$15 discount when he purchased a new camera. This was 20% off the sticker price of \$75.
Base \$75 Rate 20% Portion \$15
- c. Mary Burns got a 12% senior citizens discount when she bought a \$7.00 movie ticket. She saved \$0.84.
Base \$7.00 Rate 12% Portion \$0.84
- d. Arthur Bogey received a commission of \$13,500 when he sold the Brown's house for \$225,000. His commission rate is 6%.
Base \$225,000 Rate 6% Portion \$13,500
- e. Leo Davis deposited \$5,000 in a certificate of deposit (CD). A year later he received an interest payment of \$450, which was a yield of 9%.
Base \$5,000 Rate 9% Portion \$450
- f. Grace Tremblay is on a diet that allows her to eat 1,600 calories per day. For breakfast she had 600 calories, which is $37\frac{1}{2}\%$ of her allowance.
Base 1,600 Rate $37\frac{1}{2}\%$ Portion 600

2. Find the portion; round to the nearest hundredth if necessary:

- a. 7% of 74 5.18 ($74 \times .07$) b. 12% of 205 24.60 c. 16% of 630 100.8
- d. 7.5% of 920 69 e. 25% of 1,004 251 f. 10% of 79 7.90
- g. 103% of 44 45.32 h. 30% of 78 23.40 i. .2% of 50 .10
- j. 1% of 5,622 56.22 k. $6\frac{1}{4}\%$ of 480 30 l. 150% of 10 15
- m. 100% of 34 34 n. $\frac{1}{2}\%$ of 27 .14

3. Find the rate; round to the nearest tenth of a percent as needed:

- a. 30 is what percent of 90? $33.3\% \left(\frac{30}{90}\right)$ b. 6 is what percent of 200? 3%
- c. 275 is what percent of 1,000? 27.5% d. .8 is what percent of 44? 1.8%
- e. 67 is what percent of 2,010? 3.3% f. 550 is what percent of 250? 220%
- g. 13 is what percent of 650? 2% h. \$15 is what percent of \$455? 3.3%
- i. .05 is what percent of 100? .1% j. \$6.25 is what percent of \$10? 62.5%

4. Find the base; round to the nearest tenth as needed:

- a. 63 is 30% of $210 \left(\frac{63}{.30}\right)$ b. 60 is 33% of 181.8 c. 150 is 25% of 600
- d. 47 is 1% of 4,700 e. \$21 is 120% of \$17.50 f. 2.26 is 40% of 5.7
- g. 75 is $12\frac{1}{2}\%$ of 600 h. 18 is 22.2% of 81.1 i. \$37.50 is 50% of \$75.00
- j. 250 is 100% of 250

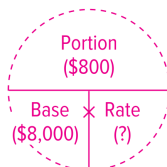
5. Find the percent of increase or decrease; round to the nearest tenth percent as needed:

Last year	This year	Amount of change	Percent of change
a. 5,962	4,378	<u>-1,584</u>	<u>$-26.6\% \left(\frac{1,584}{5,962}\right)$</u>
b. \$10,995	\$12,250	<u>1,255</u>	<u>11.4%</u>
c. 120,000	140,000	<u>20,000</u>	<u>16.7%</u>
d. 120,000	100,000	<u>-20,000</u>	<u>-16.7%</u>

WORD PROBLEMS

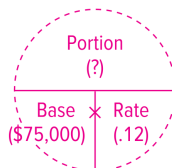
6. A machine that originally cost \$8,000 was sold for \$800 at the end of 5 years. What percent of the original cost is the selling price?

$$\frac{\$800}{\$8,000} = .10 = 10\%$$



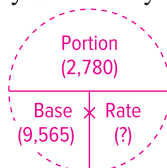
7. Joanne Byrne invested \$75,000 in a candy shop and is making 12% per year on her investment. How much money per year is she making on her investment?

$$\$75,000 \times .12 = \$9,000$$



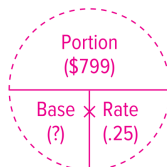
8. There was a fire in Bill Porper's store that caused 2,780 inventory items to be destroyed. Before the fire, 9,565 inventory items were in the store. What percent of inventory was destroyed? Round to nearest tenth percent.

$$\frac{2,780}{9,565} = 29.1\%$$



9. Elyse's Dress Shoppe makes 25% of its sales for cash. If the cash receipts on January 21 were \$799, what were the total sales for the day?

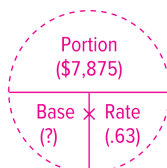
$$\frac{\$799}{.25} = \$3,196$$



10. The YMCA is holding a fund-raiser to collect money for a new gym floor. So far it has collected \$7,875, which is 63% of the goal. What is the amount of the goal? How much more money must the YMCA collect?

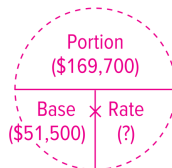
$$\frac{\$7,875}{.63} = \$12,500 \text{ goal}$$

$$\$12,500 - \$7,875 = \$4,625$$



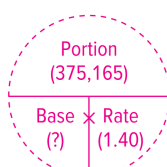
11. Leslie Tracey purchased her home for \$51,500. She sold it last year for \$221,200. What percent profit did she make on the sale? Round to nearest tenth percent.

$$\begin{array}{r} \$221,200 \\ - \$51,500 \\ \hline \$169,700 \\ \frac{\$169,700}{\$51,500} = 329.5\% \end{array}$$



12. Maplewood Park Tool & Die had an annual production of 375,165 units this year. This is 140% of the annual production last year. What was last year's annual production?

$$\frac{375,165}{1.40} = 267,975 \text{ units}$$



Learning Unit 7–1: Trade Discounts—Single and Chain*

DRILL PROBLEMS

1. Calculate the trade discount amount for each of the following items:

Item	List price	Trade discount	Trade discount amount	
a. iPhone	\$ 400	30%	<u>\$120</u>	a. $400 \times .30 = \$120$
b. Flat-screen TV	\$1,200	30%	<u>\$360</u>	b. $1,200 \times .30 = \$360$
c. Suit	\$ 500	10%	<u>\$50</u>	c. $500 \times .10 = \$50$
d. Bicycle	\$ 800	$12\frac{1}{2}\%$	<u>\$100</u>	d. $800 \times .125 = \$100$
e. David Yurman bracelet	\$ 950	40%	<u>\$380</u>	e. $950 \times .40 = \$380$

2. Calculate the net price for each of the following items:

Item	List price	Trade discount amount	Net price	
a. Home Depot table	\$600	\$250	<u>\$350</u>	a. $600 - 250 = \$350$
b. Bookcase	\$525	\$129	<u>\$396</u>	b. $525 - 129 = \$396$
c. Rocking chair	\$480	\$95	<u>\$385</u>	c. $480 - 95 = \$385$

3. Fill in the missing amount for each of the following items:

Item	List price	Trade discount amount	Net price	
a. Sears electric saw	<u>\$75</u>	\$19	\$56.00	a. $56 + 19 = \$75$
b. Electric drill	\$90	<u>\$21.50</u>	\$68.50	b. $90 - 68.50 = \$21.50$
c. Ladder	\$56	\$15.25	<u>\$40.75</u>	c. $56 - 15.25 = \$40.75$

4. For each of the following, find the percent paid (complement of trade discount) and the net price:

List price	Trade discount	Percent paid	Net price	
a. \$45	15%	<u>85%</u>	<u>\$38.25</u>	a. $100\% - 15\% = 85\%$ $45 \times .85 = \$38.25$
b. \$195	12.2%	<u>87.8%</u>	<u>\$171.21</u>	b. $100\% - 12.2\% = 87.8\%$ $195 \times .878 = \$171.21$
c. \$325	50%	<u>50%</u>	<u>\$162.50</u>	c. $100\% - 50\% = 50\%$ $325 \times .5 = \$162.50$
d. \$120	18%	<u>82%</u>	<u>\$98.40</u>	d. $100\% - 18\% = 82\%$ $120 \times .82 = \$98.40$

5. In each of the following examples, find the net price equivalent rate and the single equivalent discount rate:

Chain discount	Net price equivalent rate	Single equivalent discount rate	
a. 25/5	<u>.7125</u>	<u>.2875</u>	a. $.75 \times .95 = .7125$ $1 - .7125 = .2875$
b. 15/15	<u>.7225</u>	<u>.2775</u>	b. $.85 \times .85 = .7225$ $1 - .7225 = .2775$
c. 15/10/5	<u>.72675</u>	<u>.27325</u>	c. $.85 \times .9 \times .95 = .72675$ $1 - .72675 = .27325$
d. 12/12/6	<u>.727936</u>	<u>.272064</u>	d. $.88 \times .88 \times .94 = .727936$ $1 - .727936 = .272064$

*Freight problems to be shown in LU 7–2 material.

6. In each of the following examples, find the net price and the trade discount:

List price	Chain discount	Net price	Trade discount	
a. \$5,000	10/10/5	<u>\$3,847.50</u>	<u>\$1,152.50</u>	
b. \$7,500	9/6/3	<u>\$6,223.04</u>	<u>\$1,276.97</u>	(Total is off 1¢ due to rounding)
c. \$898	20/7/2	<u>\$654.75</u>	<u>\$243.25</u>	
d. \$1,500	25/10	<u>\$1,012.50</u>	<u>\$487.50</u>	
a.	$(.9 \times .9 \times .95) \times \$5,000 = \$3,847.50$	$\$5,000 \times (1 - .7695) = \$1,152.50$		
b.	$(.91 \times .94 \times .97) \times \$7,500 = \$6,223.035$	$\$7,500 \times (1 - .829738) = \$1,276.965$		
c.	$(.8 \times .93 \times .98) \times \$898 = \$654.74976$	$\$898 \times (1 - .72912) = \243.25		
d.	$(.75 \times .9) \times \$1,500 = \$1,012.50$	$\$1,500 \times (1 - .675) = \487.50		

7. The list price of a handheld calculator is \$19.50, and the trade discount is 18%. Find the trade discount amount.

$$\begin{array}{r} \$19.50 \\ \times .18 \\ \hline 15600 \\ 1950 \\ \hline 3.5100 = \$3.51 \end{array}$$

8. The list price of a silver picture frame is \$29.95, and the trade discount is 15%. Find the trade discount amount and the net price.

$$\begin{array}{r} \$29.95 \\ \times .15 \\ \hline 14975 \\ 2995 \\ \hline 4.4925 = \$4.49 \text{ trade discount amount} \end{array}$$

$$\begin{array}{r} \$29.95 \\ - 4.49 \\ \hline \$25.46 \text{ net price or } \$29.95 \times .85 = \$25.46 \end{array}$$

9. The net price of a set of pots and pans is \$65, and the trade discount is 20%. What is the list price?

$$\frac{\$65}{1 - .20} = \frac{\$65}{.80} = \$81.25$$

10. Jennie's Variety Store has the opportunity to purchase candy from three different wholesalers; each of the wholesalers offers a different chain discount. Company A offers 25/5/5, Company B offers 20/10/5, and Company C offers 15/20. Which company should Jennie deal with? *Hint:* Choose the company with the highest single equivalent discount rate.

Company A: $.75 \times .95 \times .95 = .676875$ $1 - .676875 = .323125 = 32.31\%$

Company B: $.8 \times .9 \times .95 = .684$ $1 - .684 = .316 = 31.6\%$

Company C: $.85 \times .8 = .68$ $1 - .68 = .32 = 32\%$

Choose Company A for the 32.31% discount.

11. The list price of a television set is \$625. Find the net price after a series discount of 30/20/10.

$$(.7 \times .8 \times .9) \times \$625 = \$315 \text{ net price}$$

12. Mandy's Accessories Shop purchased 12 purses with a total list price of \$726. What was the net price of each purse if the wholesaler offered a chain discount of 25/20?

$$(.75 \times .8) \times \$726 = \$435.60 \quad \$435.60 \div 12 = \$36.30 \text{ net price per purse}$$

13. Kransberg Furniture Store purchased a bedroom set for \$1,097.25 from Furniture Wholesalers. The list price of the set was \$1,995. What trade discount rate did Kransberg receive?

$$\text{List price} - \text{Net price} = \text{Trade discount amount} \quad \frac{\$1,995 - \$1,097.25}{\$1,995} = .45 = 45\%$$

14. Susan Monk teaches second grade and receives a discount at the local art supply store. Recently she paid \$47.25 for art supplies after receiving a chain discount of 30/10. What was the regular price of the art supplies?

$$.7 \times .9 = .63 \text{ net price equivalent rate} \quad \frac{\$47.25}{.63} = \$75$$

Learning Unit 7–2: Cash Discounts, Credit Terms, and Partial Payments

DRILL PROBLEMS

1. Complete the following table:

Date of invoice	Date of goods received	Terms	Last day of discount period	End of credit period
a. February 8		2/10, n/30	February 18	March 10
b. August 26		2/10, n/30	September 5	September 25
c. October 17		3/10, n/60	October 27	December 16
d. March 11	May 10	3/10, n/30, ROG	May 20	June 9
e. September 14		2/10, EOM	October 10	October 30
f. May 31		2/10, EOM	July 10	July 30

2. Calculate the cash discount and the net amount paid.

Invoice amount	Cash discount rate	Discount amount	Net amount paid
a. \$75	3%	\$2.25 ($\$75 \times .03$)	\$72.75 ($\$75 \times .97$)
b. \$1,559	2%	\$31.18	\$1,527.82
c. \$546.25	2%	\$10.93	\$535.33 (rounded)
d. \$9,788.75	1%	\$97.89	\$9,690.86

3. Use the complement of the cash discount to calculate the net amount paid. Assume all invoices are paid within the discount period.

Terms of invoice	Amount of invoice	Complement	Net amount paid
a. 3/10, n/30	\$1,400	.97	\$1,358
b. 3/10, n/30 ROG	\$4,500	.97	\$4,365
c. 2/10, EOM	\$375.50	.98	\$367.99
d. 1/15, n/45	\$3,998	.99	\$3,958.02

4. Calculate the amount of cash discount and the net amount paid.

Date of invoice	Terms of invoice	Amount of invoice	Date paid	Cash discount	Amount paid
a. January 12	2/10, n/30	\$5,320	January 22	\$106.40	\$5,213.60
b. May 28	2/10, n/30	\$975	June 7	\$19.50	\$955.50
c. August 15	2/10, n/30	\$7,700	August 26	0	\$7,700
d. March 8	2/10, EOM	\$480	April 10	\$9.60	\$470.40
e. January 24	3/10, n/60	\$1,225	February 3	\$36.75	\$1,188.25

5. Complete the following table:

Total invoice	Freight charges included in invoice total	Date of invoice	Terms of invoice	Date of payment	Cash discount	Amount paid
a. \$852	\$12.50	3/19	2/10, n/30	3/29	\$16.79	\$835.21
[($\$852 - \12.50) $\times$.02 = \$16.79], ($\$822.71 + \12.50 = \$835.21)						
b. \$669.57	\$15.63	7/28	3/10, EOM	9/10	\$19.62	\$649.95
[($\$669.57 - \15.63) $\times$.03 = \$19.62], ($\$634.32 + \15.63 = \$649.95)						
c. \$500	\$11.50	4/25	2/10, n/60	6/5	0	\$500.00
No discount, pay total invoice						
d. \$188	\$9.70	1/12	2/10, EOM	2/10	\$3.57	\$184.43
[($\$188 - \9.70) $\times$.02 = \$3.57], ($\$174.73 + \9.70 = \$184.43)						

6. In the following table, assume that all the partial payments were made within the discount period.

Amount of invoice	Terms of invoice	Partial payment	Amount to be credited	Balance outstanding
a. \$481.90	2/10, n/30	\$90.00	<u>\$91.84</u>	<u>\$390.06</u>
(\$90 ÷ .98 = \$91.84), (\$481.90 – \$91.84 = \$390.06)				
b. \$1,000	2/10, EOM	\$500.00	<u>\$510.20</u>	<u>\$489.80</u>
(\$500 ÷ .98 = \$510.20), (\$1,000 – \$510.20 = \$489.80)				
c. \$782.88	3/10, n/30, ROG	\$275.00	<u>\$283.51</u>	<u>\$499.37</u>
(\$275 ÷ .97 = \$283.51), (\$782.88 – \$283.51 = \$499.37)				
d. \$318.80	2/15, n/60	\$200.00	<u>\$204.08</u>	<u>\$114.72</u>
(\$200 ÷ .98 = \$204.08), (\$318.80 – \$204.08 = \$114.72)				

WORD PROBLEMS

7. Ray Chemical Company received an invoice for \$16,500, dated March 14, with terms of 2/10, n/30. If the invoice was paid March 22, what was the amount due?
 $100\% - 2\% = 98\%$ $\$16,500 \times .98 = \$16,170$
8. On May 27, Trotter Hardware Store received an invoice for trash barrels purchased for \$13,650 with terms of 3/10, EOM; the freight charge, which is included in the price, is \$412. What are (a) the last day of the discount period and (b) the amount of the payment due on this date?
- a. Last discount date is July 10 b.
- | |
|--|
| \$13,650 |
| – 412 freight |
| <hr/> 13,238 |
| × .97 complement (100% – 3% = 97%) |
| <hr/> 12,840.86 |
| + 412.00 freight |
| <hr/> \$13,252.86 total due in discount period |
9. The Glass Sailboat received an invoice for \$930.50 with terms 2/10, n/30 on April 19. On April 29, it sent a payment of \$430.50. (a) How much credit will be given on the total due? (b) What is the new balance due?
- $100\% - 2\% = 98\%$ a. $\$430.50 \div .98 = \439.29 credit given
b. $\$930.50 - \$439.29 = \$491.21$ balance due
10. Dallas Ductworks offers cash discounts of 2/10, 1/15, n/30 on all purchases. If an invoice for \$544 dated July 18 is paid on August 2, what is the amount due?
July 18 to August 2 = 15 days
 $100\% - 1\% = 99\%$
 $\$544 \times .99 = \538.56 amount due
11. The list price of a Luminox watch is \$299.90 with trade discounts of 10/20 and terms of 3/10, n/30. If a retailer pays the invoice within the discount period, what amount must the retailer pay?
- | | |
|--|--|
| $.9 \times .8 = .72$ | $100\% - 3\% = 97\%$ |
| $\$299.90 \times .72 = \$215.928 = \$215.93$ net price | $\$215.93 \times .97 = \209.45 payment |
12. The invoice of a sneakers supplier totaled \$2,488.50, was dated February 7, and offered terms 2/10, ROG. The shipment of sneakers was received on March 7. What are (a) the last date of the discount period and (b) the amount of the discount that will be lost if the invoice is paid after that date?
- a. Last discount date is March 17.
b. $\$2,488.50 \times .02 = \49.77 discount lost after March 17
13. Starburst Toy Company receives an invoice amounting to \$1,152.30 with terms of 2/10, EOM and dated November 6. If a partial payment of \$750 is made on December 8, what are (a) the credit given for the partial payment and (b) the balance due on the invoice?
- $100\% - 2\% = 98\%$ a. $\$750 \div .98 = \765.31 (rounded)
b. $\$1,152.30 - \$765.31 = \$386.99$ balance due
14. Todd's Sporting Goods received an invoice for soccer equipment dated July 26 with terms 3/10, 1/15, n/30 in the amount of \$3,225.83, which included shipping charges of \$375.50. If this bill is paid on August 5, what amount must be paid?
- | | |
|--------------------------------------|---|
| $\$3,225.83 - \$375.50 = \$2,850.33$ | $\$2,850.33 \times .97 = \$2,764.82$ (rounded) |
| $100\% - 3\% = 97\%$ | $\$2,764.82 + \$375.50 = \$3,140.32$ must be paid |

Learning Unit 8–1: Markups Based on Cost (100%)

DRILL PROBLEMS

1. Fill in the missing numbers:

Cost	Dollar markup	Selling price	
a. \$16.10	\$3.80	<u>\$19.90</u>	
$S = C + M$	$S = \$16.10 + \3.80		
b. \$8.32	<u>\$2.72</u>	\$11.04	$(\$11.04 - \$8.32 = \$2.72)$
c. \$25.27	<u>\$4.35</u>	\$29.62	$(\$29.62 - \$25.27 = \$4.35)$
d. <u>\$90.00</u>	\$75.00	\$165.00	$(\$165 - \$75 = \$90)$
e. \$86.54	\$29.77	<u>\$116.31</u>	$(\$86.54 + \$29.77 = \$116.31)$

2. Calculate the markup based on cost; round to the nearest cent.

Cost	Markup (percent of cost)	Dollar markup	
a. \$425.00	30%	<u>\$127.50</u>	$(\$425 \times .30 = \$127.50)$
b. \$1.52	20%	<u>\$0.30</u>	$(\$1.52 \times .20 = \$0.30)$
c. \$9.90	$12\frac{1}{2}\%$	<u>\$1.24</u>	$(\$9.90 \times .125 = \$1.24)$
d. \$298.10	50%	<u>\$149.05</u>	$(\$298.10 \times .50 = \$149.05)$
e. \$74.25	38%	<u>\$28.22</u>	$(\$74.25 \times .38 = \$28.22)$
f. \$552.25	100%	<u>\$552.25</u>	$(\$552.25 \times 1 = \$552.25)$

3. Calculate the dollar markup and rate of the markup as a percent of cost, rounding percents to nearest tenth percent. Verify your result, which may be slightly off due to rounding.

Cost	Selling price	Dollar markup	Markup (percent of cost)	Verify
a. \$2.50	\$4.50	<u>\$2.00</u>	<u>80%</u>	$\frac{\$2.00}{.80} = \2.50
				$(\$4.50 - \$2.50 = \$2.00); (\$2 \div \$2.50 = .8 = 80\%)$
b. \$12.50	\$19.00	<u>\$6.50</u>	<u>52%</u>	$\frac{\$6.50}{.52} = \12.50
				$(\$19.00 - \$12.50 = \$6.50); (\$6.50 \div \$12.50 = .52 = 52\%)$
c. \$0.97	\$1.25	<u>\$0.28</u>	<u>28.9%</u>	$\frac{\$.28}{.289} = \$.97$
				$(\$1.25 - \$.97 = \$0.28); (\$.28 \div \$.97 = .2886 = 28.9\%)$
d. \$132.25	\$175.00	<u>\$42.75</u>	<u>32.3%</u>	$\frac{\$42.75}{.323} = \132.35
				$(\$175 - \$132.25 = \$42.75); (\$42.75 \div \$132.25 = .3232 = 32.3\%)$
e. \$65.00	\$89.99	<u>\$24.99</u>	<u>38.4%</u>	$\frac{\$24.99}{.384} = \65.08
				$(\$89.99 - \$65 = \$24.99); (\$24.99 \div \$65 = .3844 = 38.4\%)$

4. Calculate the dollar markup and the selling price.

Cost	Markup (percent of cost)	Dollar markup	Selling price	
a. \$2.20	40%	<u>\$0.88</u>	<u>\$3.08</u>	$S = C + M$
				$S = \$2.20 + .40 (\$2.20)$
b. \$2.80	16%	<u>\$0.45</u>	<u>\$3.25</u>	
				$(\$2.80 \times .16 = \$0.448 = \$0.45); (\$2.80 + \$0.45 = \$3.25)$
c. \$840.00	$12\frac{1}{2}\%$	<u>\$105.00</u>	<u>\$945.00</u>	
				$(\$840 \times .125 = \$105); (\$840 + \$105 = \$945)$
d. \$24.36	30%	<u>\$7.31</u>	<u>\$31.67</u>	
				$(\$24.36 \times .30 = \$7.31); (\$24.36 + \$7.31 = \$31.67)$

5. Calculate the cost, rounding to the nearest cent.

	Selling price	Rate of markup based on cost	Cost	
a.	\$1.98	30%	<u>\$1.52</u>	$S = C + M$
	$(\$1.98 \div 1.30 = \$1.52)$			$\$1.98 = C + .30C$
b.	\$360.00	60%	<u>\$225.00</u>	$S = C + M$
	$(\$360 \div 1.60 = \$225)$			$\$360 = C + .60C$
c.	\$447.50	20%	<u>\$372.92</u>	
	$(\$447.50 \div 1.20 = \$372.92)$			
d.	\$1,250.00	100%	<u>\$625.00</u>	
	$(\$1,250 \div 2 = \$625)$			

6. Find the missing numbers. Round money to the nearest cent and percents to the nearest tenth percent.

	Cost	Dollar markup	Percent markup on cost	Selling price	
a.	\$72.00	<u>\$28.80</u>	40%	<u>\$100.80</u>	$S = C + M$
	$(\$72 \times .40 = \$28.80); (\$72.00 + \$28.80 = \$100.80)$				$S = \$72 + .40 (\$72)$
b.	<u>\$28.00</u>	\$7.00	<u>25%</u>	\$35.00	$S = C + M$
	$(\$35 - \$7 = \$28); (\$7 \div \$28 = .25 = 25\%)$				$\$35 = C + \7
c.	\$8.80	\$1.10	<u>12.5%</u>	<u>\$9.90</u>	
	$(\$1.10 \div \$8.80 = .125 = 12.5\%); (\$8.80 + \$1.10 = \$9.90)$				
d.	<u>\$15.50</u>	<u>\$4.34</u>	28%	\$19.84	$S = C + M$
	$(\$19.84 \div 1.28 = \$15.50); (\$19.84 - \$15.50 = \$4.34)$				$\$19.84 = C + .28C$
e.	\$175.00	<u>\$61.25</u>	<u>35%</u>	\$236.25	
	$(\$236.25 - \$175 = \$61.25); (\$61.25 \div \$175 = .35 = 35\%)$				

WORD PROBLEMS

7. If the cost of a Pottery Barn chair is \$499 and the markup rate is 40% of the cost, what are (a) the dollar markup and (b) the selling price?
- a. $\$499 \times .40 = \199.60 markup $S = C + M$
b. $\$499 + \$199.60 = \$698.60$ selling price $S = \$499 + .35 (\$499)$
8. If Barry's Furniture Store purchased a floor lamp for \$120 and plans to add a markup of \$90, (a) what will the selling price be and (b) what is the markup as a percent of cost?
- a. $\$120 + \$90 = \$210$ selling price $S = C + M$
b. $\$90 \div \$120 = .75 = 75\%$ markup $S = \$120 + \90
9. If Lesjardin's Jewelry Store is selling a gold bracelet for \$349, which includes a markup of 35% on cost, what are (a) Lesjardin's cost and (b) the amount of the dollar markup?
- a. $\$349 \div 1.35 = \$258.518 = \$258.52$ cost $S = C + M$
b. $\$349 - \$258.52 = \$90.48$ markup $\$349 = C + .35C$
10. Toll's Variety Store sells an alarm clock for \$14.75. The alarm clock cost Toll's \$9.90. What is the markup amount as a percent of cost? Round to the nearest whole percent.
- $\$14.75 - \$9.90 = \$4.85$ $\$4.85 \div \$9.90 = .4898 = 49\%$ markup
11. Swanson's Audio Supply marks up its merchandise by 40% on cost. If the markup on a cassette player is \$85, what are (a) the cost of the cassette player and (b) the selling price?
- a. $\$85 \div .40 = \212.50 cost $C = \frac{\text{Dollar markup}}{\text{Percent markup on cost}}$ $S = C + M$
b. $\$212.50 + \$85 = \$297.50$ selling price $C = \frac{\$85}{.40}$ $S = \$212.50 + \85
12. Brown's Department Store is selling a shirt for \$55. If the markup is 70% on cost, what is Brown's cost (to the nearest cent)?
- $\$55 \div 1.70 = \32.35 $\text{Cost} = \frac{\text{Selling price}}{1 + \text{Percent markup on cost}}$
13. Ward's Greenhouse purchased tomato flats for \$5.75 each. Ward's has decided to use a markup of 42% on cost. Find the selling price.
- $\$5.75 \times .42 = \$2.415 = \$2.42$ $S = C + M$
 $\$5.75 + \$2.42 = \$8.17$ selling price $S = \$5.75 + .42 (\$5.75)$

Learning Unit 8–2: Markups Based on Selling Price (100%)

DRILL PROBLEMS

1. Calculate the markup based on the selling price.

Selling price	Markup (percent of selling price)	Dollar markup	
a. \$25.00	40%	<u>\$10</u>	$(\$25.00 \times .40 = \$10)$
b. \$230.00	25%	<u>\$57.50</u>	$(\$230 \times .25 = \$57.50)$
c. \$81.00	42.5%	<u>\$34.43</u>	$(\$81 \times .425 = 34.425 = \$34.43)$
d. \$72.88	$37\frac{1}{2}\%$	<u>\$27.33</u>	$(\$72.88 \times .375 = \$27.33)$
e. \$1.98	$7\frac{1}{2}\%$	<u>\$0.15</u>	$(\$1.98 \times .075 = \$1.48 = \$0.15)$

2. Calculate the dollar markup and the markup as a percent of selling price (to the nearest tenth percent). Verify your answer, which may be slightly off due to rounding.

Cost	Selling price	Dollar markup	Markup (percent of selling price)	Verify
a. \$2.50	\$4.25	<u>\$1.75</u>	<u>41.2%</u>	$\frac{\$1.75}{.412} = \4.25 $(\$4.25 - \$2.50 = \$1.75); (\$1.75 \div \$4.25 = .4117 = 41.2\%)$
b. \$16.00	\$24.00	<u>\$8.00</u>	<u>33.3%</u>	$\frac{\$8.00}{.333} = \24.02 $(\$24 - \$16 = \$8); (\$8 \div \$24 = .3333 = 33.3\%)$
c. \$45.25	\$85.00	<u>\$39.75</u>	<u>46.8%</u>	$\frac{\$39.75}{.468} = \84.94 $(\$85 - \$45.25 = \$39.75); (\$39.75 \div \$85 = .4676 = 46.8\%)$
d. \$0.19	\$0.25	<u>\$0.06</u>	<u>24%</u>	$\frac{\$.06}{.24} = \$.25$ $(\$0.25 - \$0.19 = \$.06); (\$.06 \div \$0.25 = .24 = 24\%)$
e. \$5.50	\$8.98	<u>\$3.48</u>	<u>38.8%</u>	$\frac{\$3.48}{.388} = \8.97 $(\$8.98 - \$5.50 = \$3.48); (\$3.48 \div \$8.98 = .3875 = 38.8\%)$

3. Given the
- cost*
- and the markup as a percent of
- selling price*
- , calculate the selling price.

Cost	Markup (percent of selling price)	Selling price	
a. \$5.90	15%	<u>\$6.94</u>	$S = C + M$ $S = \$5.90 + .15S$ $[\$5.90 \div (1 - .15) = \$5.90 \div .85 = \$6.941 = \$6.94]$
b. \$600	32%	<u>\$882.35</u>	$S = C + M$ $S = \$600 + .32S$ $[\$600 \div (1 - .32) = \$600 \div .68 = \$882.352 = \$882.35]$
c. \$15	50%	<u>\$30</u>	$S = C + M$ $S = \$15 + .50(S)$ $[\$15 \div (1 - .50) = \$15 \div .50 = \$30]$
d. \$120	30%	<u>\$171.43</u>	$S = C + M$ $S = \$120 + .30(S)$ $[\$120 \div (1 - .30) = \$120 \div .70 = \$171.43]$
e. \$0.29	20%	<u>\$0.36</u>	$S = C + M$ $S = \$.29 + .20(S)$ $[\$.29 \div (1 - .20) = \$.29 \div .8 = \$0.362 = \$0.36]$

4. Given the selling price and the percent markup on selling price, calculate the cost.

Cost	Markup (percent of selling price)	Selling price	
a. <u>\$3.75</u>	40%	\$6.25	$S = C + M$ $\$6.25 = C + .40(\$6.25)$
b. <u>\$13.00</u>	20%	\$16.25	$S = C + M$ $\$16.25 = C + .20(\$16.25)$
c. <u>\$51.75</u>	19%	\$63.89	$S = C + M$ $\$63.89 = C + .19(\$63.89)$
d. <u>\$16.50</u>	$62\frac{1}{2}\%$	\$44.00	$S = C + M$ $\$44 = C + .625(\$44)$

5. Calculate the equivalent rate of markup, rounding to the nearest hundredth percent.

Markup on cost	Markup on selling price	Markup on cost	Markup on selling price
a. 40%	<u>28.57%</u>	b. 50%	<u>33.33%</u>
$(.40 \div 1.40 = .28571 = 28.57\%)$		$(.50 \div 1.50 = .3333 = 33.33\%)$	
c. <u>100%</u>	50%	d. <u>53.85%</u>	35%
$(.50 \div .50 = 1 = 100\%)$		$(.35 \div .65 = .53846 = 53.85\%)$	
e. <u>66.67%</u>	40%		
$(.40 \div .60 = .66666 = 66.67\%)$			

WORD PROBLEMS

6. Fisher Equipment is selling a Wet/Dry Shop Vac for \$49.97. If Fisher's markup is 40% of the selling price, what is the cost of the Shop Vac?

$$\begin{array}{rcl}
 \$49.97 = C + .40(\$49.97) & & \\
 \$49.97 = C + \$19.99 & \text{or} & \$49.97 \times (1 - .40) \\
 \underline{- 19.99} & & \underline{- 19.99} \\
 \$29.98 = C & &
 \end{array}$$

7. Gove Lumber Company purchased a 10-inch table saw for \$225 and will mark up the price 35% on the selling price. What will the selling price be?

$$\begin{array}{rcl}
 S = \$225 + .35S & & \\
 \underline{-.35S} & & \underline{-.35S} \\
 .65S = \$225 & \text{or} & \frac{\$225}{1 - .35} \\
 \underline{.65} & & \\
 S = \$346.153 = \$346.15 & &
 \end{array}$$

8. To realize a sufficient gross margin, City Paint and Supply Company marks up its paint 27% on the selling price. If a gallon of Latex Semi-Gloss Enamel has a markup of \$4.02, find (a) the selling price and (b) the cost.

$$\begin{array}{lcl}
 \text{a. } \frac{\$4.02}{.27} = \$14.89 & \text{b. } \$14.89 - \$4.02 = C & S = \frac{\text{Dollar markup}}{\text{Percent markup on selling price}} \\
 & \$10.87 = C &
 \end{array}$$

9. A Magnavox 20-inch color TV cost \$180 and sells for \$297. What is the markup based on the selling price? Round to the nearest hundredth percent.

$$\$297 - \$180 = \$117 \text{ markup} \quad \$117 \div \$297 = .39393 = 39.39\%$$

10. Bargain Furniture sells a five-piece country maple bedroom set for \$1,299. The cost of this set is \$700. What are (a) the markup on the bedroom set, (b) the markup percent on cost, and (c) the markup percent on the selling price? Round to the nearest hundredth percent.

$$\begin{array}{lcl}
 \text{a. } \$1,299 - \$700 = \$599 & \text{b. } \frac{\$599}{\$700} = 85.57\% & \text{c. } \frac{\$599}{\$1,299} = 46.11\%
 \end{array}$$

11. Robert's Department Store marks up its sundries by 28% on the selling price. If a 6.4-ounce tube of toothpaste costs \$1.65, what will the selling price be?

$$\begin{array}{rcl}
 S = \$1.65 + .28S & & \\
 \underline{-.28S} & & \underline{-.28S} \\
 .72S = \$1.65 & \text{or} & \frac{\$1.65}{1 - .28} \\
 \underline{.72} & & \\
 S = \$2.291 = \$2.29 \text{ selling price} & &
 \end{array}$$

12. To be competitive, Tinker Toys must sell the DS software for \$89.99. To meet expenses and make a sufficient profit, Tinker Toys must add a markup on the selling price of 23%. What is the maximum amount that Tinker Toys can afford to pay a wholesaler for the DS software?

$$\begin{array}{rcl}
 \$89.99 = C + .23(\$89.99) & \text{or} & \$89.99 \times (1 - .23) \\
 \$89.99 = C + \$20.70 & & \\
 \underline{- 20.70} & & \underline{- 20.70} \\
 \$69.29 = C \text{ (maximum cost)} & &
 \end{array}$$

13. Nicole's Restaurant charges \$7.50 for a linguini dinner that costs \$2.75 for the ingredients. What rate of markup is earned on the selling price? Round to the nearest hundredth percent.

$$\$7.50 - \$2.75 = \$4.75 \quad \$4.75 \div \$7.50 = .63333 = 63.33\% \text{ on selling price}$$

Learning Unit 8–3: Markdowns and Perishables

DRILL PROBLEMS

1. Find the dollar markdown and the sale price.

Original selling price	Markdown percent	Dollar markdown	Sale price
a. \$200	40%	<u>\$80</u>	<u>\$120</u>
$(\$200 \times .40 = \$80), (\$200 - \$80 = \$120)$			
b. \$2,099.98	25%	<u>\$525</u>	<u>\$1,574.98</u>
$(\$2,099.98 \times .25 = \$524.995 = \$525)$ $(\$2,099.98 - \$525 = \$1,574.98)$			
c. \$729	30%	<u>\$218.70</u>	<u>\$510.30</u>
$(\$729 \times .30 = \$218.70), (\$729 - \$218.70 = \$510.30)$			

2. Find the dollar markdown and the markdown percent on original selling price.

Original selling price	Sale price	Dollar markdown	Markdown percent
a. \$19.50	\$9.75	<u>\$9.75</u>	<u>50%</u>
$(\$19.50 - \$9.75 = \$9.75) \quad \left(\frac{\$9.75}{\$19.50} = .050 = 50\% \right)$			
b. \$250	\$175	<u>\$75</u>	<u>30%</u>
$(\$250 - \$175 = \$75) \quad \left(\frac{\$75}{\$250} = 30\% \right)$			
c. \$39.95	\$29.96	<u>\$9.99</u>	<u>25%</u>
$(\$39.95 - \$29.96 = \$9.99) \quad \left(\frac{\$9.99}{\$39.95} = 25\% \right)$			

3. Find the original selling price.

Sale price	Markdown percent	Original selling price	
a. \$328	20%	<u>\$410</u>	$\frac{P \$328}{B \times R} .80$
$(100\% - 20\% = 80\%) \quad \left(\frac{\$328}{.80} = \$410 \right)$			
b. \$15.85	15%	<u>\$18.65</u>	
$(100\% - 15\% = 85\%) \quad \left(\frac{\$15.85}{.85} = \$18.65 \right)$			

4. Calculate the final selling price.

Original selling price	First markdown	Second markdown	Final markup	Final selling price
a. \$4.96	25%	8%	5%	<u>\$3.59</u>
$[\$4.96 \times (1 - .25) = \$3.72]$ $[\$3.72 \times (1 - .08) = \$3.42]$ $[\$3.42 \times (1 + .05) = \$3.59]$				
b. \$130	30%	10%	20%	<u>\$98.28</u>
$[\$130 \times (1 - .30) = \$91]$ $[\$91 \times (1 - .10) = \$81.90]$ $[\$81.90 \times (1 + .20) = \$98.28]$				

5. Find the missing amounts.

	Number of units	Unit cost	Total cost	Estimated* spoilage	Desired markup (percent of cost)	Total selling price	Selling price per unit
a.	72	\$3	<u>\$216</u>	12%	50%	<u>\$324</u>	<u>\$5.14</u>
	$(72 \times \$3 = \$216); [\$216 + (\$216 \times .50) = \$324]$ $(72 \times .12 = 8.64 = 9 \text{ units}) \quad TS = TC + TM$ $[\$324 / (72 - 9) = \$5.14]$						
b.	50	\$0.90	<u>\$45</u>	16%	42%	<u>\$63.90</u>	<u>\$1.52</u>
	$(50 \times \$0.90 = \$45), [\$45 + (\$45 \times .42) = \$63.90]$ $(50 \times .16 = 8 \text{ units})$ $[\$63.90 / (50 - 8) = \$1.52]$						

*Round to the nearest whole unit as needed.

WORD PROBLEMS

6. Speedy King is having a 30%-off sale on its box springs and mattresses. A queen-size, back-supporter mattress is priced at \$325. What is the sale price of the mattress?
 $\$325 \times .30 = \97.50 or $\$325 \times .70 = \227.50
 $\$325 - \$97.50 = \$227.50$
7. Murray and Sons sells a Dell computer for \$602.27. It is having a sale, and the computer is marked down to \$499.88. What is the percent of the markdown?
 $\$602.27 - \$499.88 = \$102.39$ $\frac{\$102.39}{\$602.27} = 17\%$
8. Coleman's is having a clearance sale. A lamp with an original selling price of \$249 is now selling for \$198. Find the percent of the markdown. Round to the nearest hundredth percent.
 $\$249 - \$198 = \$51$ $\frac{\$51}{\$249} = 20.48\%$
9. Sarah's Sports Shop has advertised markdowns on certain items of 22%. A soccer ball is marked with a sale price of \$16.50. What was the original price of the soccer ball?
 $100\% - 22\% = 78\%$ $\frac{\$16.50}{.78} = \21.15 $\frac{P}{B \times R} = \frac{\$16.50}{? \times .78}$
10. Sam Grillo sells seasonal furnishings. Near the end of the summer a five-piece patio set that was priced \$349.99 had not been sold, so he marked it down by 12%. As Labor Day approached, he still had not sold the patio set, so he marked it down an additional 18%. What was the final selling price of the patio set?
 $\$349.99 \times .88 = \$307.99 \times .82 = \$252.55$
11. Calsey's Department Store sells its down comforters for a regular price of \$325. During its white sale the comforters were marked down 22%. Then, at the end of the sale, Calsey's held a special promotion and gave a second markdown of 10%. When the sale was over, the remaining comforters were marked up 20%. What was the final selling price of the remaining comforters?
 $\$325 \times .78 = \253.50 $\$253.50 \times .90 = \228.15 $\$228.15 \times 1.2 = \273.78
12. The New Howard Bakery wants to make a 60% profit on the cost of its pies. To calculate the price of the pies, it estimated that the usual amount of spoilage is five pies. Calculate the selling price for each pie if the number of pies baked each day is 24 and the cost of the ingredients for each pie is \$1.80.
 $24 \times \$1.80 = \43.20 total cost
 $\$43.20 \times 1.60 = \69.12 total selling price $TS = TC + TM$
 $24 - 5 = 19$
 $\frac{\$69.12}{19} = \3.64 per pie
13. Sunshine Bakery bakes 660 loaves of bread each day and estimates that 10% of the bread will go stale before it is sold and thus will have to be discarded. The owner of the bakery wishes to realize a 55% markup on cost on the bread. If the cost to make a loaf of bread is \$0.46, what should the owner sell each loaf for?
 $660 \times \$0.46 = \303.60 total cost $\$470.58 / (660 - 66) = \0.79
 $\$303.60 \times 1.55 = \470.58 total selling price
 $660 \times .10 = 66$ units spoilage

Learning Unit 8–4: Breakeven Analysis

DRILL PROBLEMS

1. Calculate the contribution margin.

	Selling price per unit	Variable cost per unit	Contribution margin
a.	\$14.00	\$8.00	\$6.00
b.	\$15.99	\$4.88	\$11.11
c.	\$18.99	\$4.99	\$14.00
d.	\$251.86	\$110.00	\$141.86
e.	\$510.99	\$310.00	\$200.99
f.	\$1,000.10	\$410.00	\$590.10

2. Calculate the selling price per unit.

	Selling price per unit	Variable cost per unit	Contribution margin
a.	\$16.28	\$12.18	\$4.10
b.	\$24.37	\$19.19	\$5.18
c.	\$34.00	\$21.00	\$13.00
d.	\$55.88	\$41.00	\$14.88
e.	\$207.60	\$128.10	\$79.50
f.	\$159.99	\$99.99	\$60.00

3. Calculate the breakeven point, rounding to the nearest whole unit.

	Breakeven point	Fixed cost	Selling price per unit	Variable cost per unit
a.	16,667	\$50,000	\$4.00	\$1.00
b.	7,500	\$30,000	\$6.00	\$2.00
c.	3,333	\$20,000	\$9.00	\$3.00
d.	12,500	\$100,000	\$12.00	\$4.00
e.	13,333	\$120,000	\$14.00	\$5.00
f.	5,000	\$90,000	\$26.00	\$8.00

WORD PROBLEMS

4. Jones Co. produces bars of candy. Each bar sells for \$3.99. The variable cost per unit is \$2.85. What is the contribution margin for Jones Co.?

$$\$3.99 - \$2.85 = \$1.14$$

5. Logan Co. produces stuffed animals. It has \$40,000 in fixed costs. Logan sells each animal for \$19.99 with a \$12.10 cost per unit. What is the breakeven point for Logan? Round to the nearest whole number.

$$\frac{\$40,000}{\$19.99 - \$12.10} = \frac{\$40,000}{\$7.89} = 5,070$$

6. Ranyo Company produces lawn mowers. It has a breakeven point of 6,000 lawn mowers. If its contribution margin is \$150, what is Ranyo's fixed cost?

$$BE = \frac{FC}{CM}$$

$$FC = BE \times CM = 6,000 \times \$150$$

$$FC = \$900,000$$

7. Moore company has \$100,000 in fixed costs. Its contribution margin is \$4.50. Calculate the breakeven point for Moore to the nearest whole number.

$$\frac{\$100,000}{\$4.50} = 22,222 \text{ units}$$

Learning Unit 9–1: Calculating Various Types of Employees' Gross Pay**DRILL PROBLEMS**

1. Fill in the missing amounts for each of the following employees. Do not round the overtime rate in your calculations and round your final answers to the nearest cent.

Employee	Total hours	Rate per hour	Regular pay	Overtime pay	Gross pay
a. Mel Jones	38	\$11.25	<u>\$427.50</u>	<u>\$ 0.00</u>	<u>\$427.50</u>
b. Casey Guitare	43	\$9.00	<u>\$360.00</u>	<u>\$40.50</u>	<u>\$400.50</u>
c. Norma Harris	37	\$7.50	<u>\$277.50</u>	<u>\$ 0.00</u>	<u>\$277.50</u>
d. Ed Jackson	45	\$12.25	<u>\$490.00</u>	<u>\$91.88</u>	<u>\$581.88</u>

- a. $38 \times \$11.25 = \427.50
 b. $(40 \times \$9.00 = \$360.00) + (3 \times \$13.50 = \$40.50) = \$400.50$
 c. $37 \times \$7.50 = \277.50
 d. $(40 \times \$12.25 = \$490.00) + (5 \times \$18.375 = \$91.875) = \$581.88$

2. Calculate each employee's gross from the following data. Do not round the overtime rate in your calculation but round your final answers to the nearest cent.

Employee	S	M	Tu	W	Th	F	S	Total hours	Rate per hour	Regular pay	Overtime pay	Gross pay
a. L. Adams	0	8	8	8	8	8	0	<u>40</u>	\$8.10	<u>\$324.00</u>	<u>\$ 0.00</u>	<u>\$324.00</u>
b. M. Card	0	9	8	9	8	8	4	<u>46</u>	\$11.35	<u>\$454.00</u>	<u>\$102.15</u>	<u>\$556.15</u>
c. P. Kline	2	$7\frac{1}{2}$	$8\frac{1}{4}$	8	$10\frac{3}{4}$	9	2	<u>$47\frac{1}{2}$</u>	\$10.60	<u>\$424.00</u>	<u>\$119.25</u>	<u>\$543.25</u>
d. J. Mack	0	$9\frac{1}{2}$	$9\frac{3}{4}$	$9\frac{1}{2}$	10	10	4	<u>$52\frac{3}{4}$</u>	\$9.95	<u>\$398.00</u>	<u>\$190.29</u>	<u>\$588.29</u>

- a. $40 \times \$8.10 = \324.00
 b. $(40 \times \$11.35 = \$454.00) + (6 \times \$17.025 = \$102.15) = \$556.15$
 c. $(40 \times \$10.60 = \$424.00) + \left(7\frac{1}{2} \times \$15.90 = \$119.25\right) = \543.25
 d. $(40 \times \$9.95 = \$398.00) + \left(12\frac{3}{4} \times \$14.925 = \$190.29\right) = \588.29

3. Calculate the gross wages of the following production workers.

Employee	Rate per unit	No. of units produced	Gross pay
a. A. Bossie	\$0.67	655	<u>\$438.85</u> $\$0.67 \times 655 = \438.85
b. J. Carson	$\$0.87\frac{1}{2}$	703	<u>\$615.13</u> $\$0.875 \times 703 = \$615.125 = \$615.13$

4. Using the given differential scale, calculate the gross wages of the following production workers.

Units produced	Amount per unit	Employee	Units produced	Gross pay
From 1–50	\$.55	a. F. Burns	190	<u>\$124.80</u>
From 51–100	.65	b. B. Gutierrez	210	<u>\$141.50</u>
From 101–200	.72	c. E. Jackson	200	<u>\$132.00</u>
More than 200	.95			

a. $(50 \times \$0.55) + (50 \times \$0.65) + (90 \times \$0.72) = \124.80
 b. $(50 \times \$0.55) + (50 \times \$0.65) + (100 \times \$0.72) + (10 \times \$0.95) = \$141.50$
 c. $(50 \times \$0.55) + (50 \times \$0.65) + (100 \times \$0.72) = \132.00

5. Calculate the following salespersons' gross wages.

- a. Straight commission:

Employee	Net sales	Commission	Gross pay
M. Salley	\$40,000	13%	<u>\$5,200</u>
	$\$40,000 \times .13 = \$5,200$		

b. Straight commission with draw:

Employee	Net sales	Commission	Draw	Commission minus draw
G. Gorsbeck	\$38,000	12%	\$600	<u>\$3,960</u>
$(\$38,000 \times .12) - \$600 = \$3,960$				

c. Variable commission scale:

Up to \$25,000	8%
Excess of \$25,000 to \$40,000	10%
More than \$40,000	12%

Employee	Net sales	Gross pay
H. Lloyd	\$42,000	<u>\$3,740</u>
$(\$25,000 \times .08) + (\$15,000 \times .10) + (\$2,000 \times .12) = \$3,740$		

d. Salary plus commission:

Employee	Salary	Commission	Quota	Net sales	Gross pay
P. Floyd	\$2,500	3%	\$400,000	\$475,000	<u>\$4,750</u>
$(\$475,000 - \$400,000) \times .03 + \$2,500 = \$4,750$					

WORD PROBLEMS

For all problems with overtime, be sure to round only the final answer.

6. In the first week of December, Dana Robinson worked 52 hours. His regular rate of pay is \$11.25 per hour. What was Dana's gross pay for the week?

$$\begin{array}{rcl} 52 - 40 = 12 \text{ hours overtime} & & \$652.50 \text{ gross pay} \\ (40 \times \$11.25) + (12 \times \$16.875) & & \\ \$450 & + & \$202.50 \end{array}$$

7. Davis Fisheries pays its workers for each box of fish they pack. Sunny Melanson receives \$.30 per box. During the third week of July, Sunny packed 2,410 boxes of fish. What was Sunny's gross pay?

$$2,410 \times \$0.30 = \$723.00 \text{ gross pay}$$

8. Maye George is a real estate broker who receives a straight commission of 6%. What would her commission be for a house that sold for \$197,500?

$$\$197,500 \times .06 = \$11,850 \text{ commission}$$

9. Devon Company pays Eileen Haskins a straight commission of $12\frac{1}{2}\%$ on net sales. In January, Devon gave Eileen a draw of \$600. She had net sales that month of \$35,570. What was Eileen's commission minus draw?

$$\begin{array}{r} \$35,570 \times .125 = \$4,446.25 \\ - 600.00 \\ \hline \$3,846.25 \text{ commission minus draw} \end{array}$$

10. Parker and Company pays Selma Stokes on a variable commission scale. In a month when Selma had net sales of \$155,000, what was her gross pay based on the following schedule?

Net sales	Commission rate
Up to \$40,000	5%
Excess of \$40,000 to \$75,000	5.5%
Excess of \$75,000 to \$100,000	6%
More than \$100,000	7%
$(\$40,000 \times .05) + (\$35,000 \times .055) + (\$25,000 \times .06) + (\$55,000 \times .07)$	\$9,275 gross pay
$\$2,000 + \$1,925 + \$1,500 + \$3,850$	

11. Marsh Furniture Company pays Joshua Charles a monthly salary of \$1,900 plus a commission of $2\frac{1}{2}\%$ on sales over \$12,500. Last month, Joshua had net sales of \$17,799. What was Joshua's gross pay for the month?

$$\begin{aligned} & \$1,900 + [(\$17,799 - \$12,500) \times .025] && \$2,032.48 \text{ gross pay} \\ & \$1,900 + && \$132.48 \end{aligned}$$

12. Amy McWha works at Lamplighter Bookstore where she earns \$7.75 per hour plus a commission of 2% on her weekly sales in excess of \$1,500. Last week, Amy worked 39 hours and had total sales of \$2,250. What was Amy's gross pay for the week?

$$\begin{array}{rcl} (\$7.75 \times 39) & + & [(\$2,250 - \$1,500) \times .02] \\ \$302.25 & + & \$15.00 \end{array} \quad \begin{array}{l} \\ \\ \end{array} \quad \begin{array}{l} \\ \\ \$317.25 \text{ gross pay} \end{array}$$

Learning Unit 9–2: Computing Payroll Deductions for Employees' Pay; Employers' Responsibilities

DRILL PROBLEMS

Use tables in the *Business Math Handbook* (assume FICA rates in text).

Employee	Allowances and marital status	Cumulative earnings	Salary per week	S.S.	Taxable earnings Medicare
1. Pete Small	M	\$160,000	\$4,000	a. <u>\$4,000</u>	b. <u>\$4,000</u>
2. Alice Hall	M	\$168,000	\$3,800	c. <u>\$600</u>	d. <u>\$3,800</u>
3. Jean Rose	S	\$170,000	\$5,000	e. <u>\$0</u>	f. <u>\$5,000</u>

$$\begin{array}{r} \text{c. } \$168,600 \\ - 168,000 \\ \hline \$ 600 \end{array}$$

4. What is the tax for Social Security and Medicare for Pete in Problem 1?
 Social Security: $.062 \times \$4,000 = \248 Medicare: $.0145 \times \$4,000 = \58
5. Calculate Pete's FIT by the percentage method.

$$\begin{array}{r} \$4,000 \\ - 2,375 \\ \hline \$1,625 \end{array}$$

$$\$208.64 + (\$1,625 \times .22) = \$566.14 \text{ FIT}$$
6. What would the employer contribute for this week's payroll for SUTA and FUTA?
 0; wages over \$7,000 are exempt

WORD PROBLEMS

7. Cynthia Pratt has earned \$168,300 thus far this year. This week she earned \$3,500. Find her total FICA tax deduction (Social Security and Medicare).

$$\begin{array}{r} \text{Social Security: } \$168,600 \\ - 168,300 \\ \hline \$ 300 \times .062 = \$18.60 \end{array} \quad \begin{array}{r} \text{Total FICA: } \$ 18.60 \\ + 50.75 \\ \hline \$ 69.35 \end{array}$$

8. If Cynthia (Problem 7) earns \$1,050 the following week, what will be her new total FICA tax deduction?
 $.0145 \times \$1,050 = \15.23 Medicare
 No Social Security
9. Roger Alley, a service dispatcher, has weekly earnings of \$750. He is married, filing jointly. Besides his FIT and FICA deductions, he has deductions of \$35.16 for medical insurance and \$17.25 for union dues. Calculate his net earnings for the third week in February. Use the percentage method.

$$\begin{array}{r} \text{FIT} = \$ 55.64 \\ \text{Social Security} = 68.20 (.062 \times \$11) \\ \text{Medicare} = 15.95 (.0145 \times 1,100) \\ \text{Medical} = 35.16 \\ \text{Union dues} = 17.25 \\ \hline \text{Total deductions} = \$192.20 \end{array} \quad \begin{array}{r} \text{FIT} \\ 1100 \\ -1008 \\ \hline 92 \quad \$44.60 + .12(92) = \$55.64 \\ \$750 - \$192.20 = \$557.70 \end{array}$$

10. Nicole Mariotte is unmarried, filing single. In the second week of February, she earned \$707.35. Deductions from her pay included federal withholding, Social Security, Medicare, health insurance for \$47.75, and \$30.00 for the company meal plan. What is Nicole's net pay for the week? Use the percentage method.

$$\begin{array}{r} \$ 707.35 \\ -504.00 \\ \hline \$ 203.35 \\ \$ 22.30 \\ \hline \text{Social Security: } .062 \times 707.35 = \$43.86 \\ \text{Medicare: } .0145 \times 707.35 = \$10.26 \end{array} \quad \begin{array}{r} \text{FIT} \\ \$ 46.70 \\ \text{Social Security} \\ 43.86 \\ \text{Medicare} \\ 10.26 \\ \text{Health insurance} \\ 47.75 \\ \text{Meal plan} \\ 30.00 \\ \hline \text{Total deductions} \\ \$178.57 \\ \$707.35 - 178.57 = \$528.78 \end{array}$$

11. Gerald Knowlton had total gross earnings of \$168,000 in the last week of November. His earnings for the first week in December were \$804.70. His employer uses the percentage method to calculate federal withholding. If Gerald is married, filing jointly, and has medical insurance of \$52.25 deducted each week from his pay, what is his net pay for the week?

$$\begin{array}{r} \$804.70 \\ - 562.00 \\ \hline \$242.70 \times .10 = \$24.27 \end{array}$$

$$\begin{array}{r} \text{FIT } 24.27 \\ \text{Social Security: } \$168,000 \\ - 168,000 \\ \hline \$ 600 \times .062 = \$37.20 \end{array}$$

$$\begin{array}{r} \$804.70 \\ - 24.27 \text{ FIT} \\ - 37.20 \text{ Social Security} \\ - 11.67 \text{ Medicare} \\ - 52.25 \text{ Medical insurance} \\ \hline \$679.31 \text{ net pay} \end{array}$$

Learning Unit 10–1: Calculation of Simple Interest and Maturity Value

DRILL PROBLEMS

1. Find the simple interest for each of the following loans:

Principal	Rate	Time	Interest	
a. \$12,000	2%	1 year	<u>\$240</u>	a. $\$12,000 \times .02 \times 1 = \240
b. \$3,000	12%	3 years	<u>\$1,080</u>	b. $\$3,000 \times .12 \times 3 = \$1,080$
c. \$18,000	$8\frac{1}{2}\%$	10 months	<u>\$1,275</u>	c. $\$18,000 \times .085 \times \frac{10}{12} = \$1,275$

2. Find the simple interest for each of the following loans; use the exact interest method. Use the days-in-a-year calendar in the text when needed.

Principal	Rate	Time	Interest	
a. \$900	4%	30 days	<u>\$2.96</u>	July 11 192
b. \$4,290	8%	250 days	<u>\$235.07</u>	March 11 - 70
c. \$1,500	8%	Made March 11 Due July 11	<u>\$40.11</u>	122

$$\begin{array}{lll} \text{a. } \$900 \times .04 \times \frac{30}{365} = \$2.96 & \text{b. } \$4,290 \times .08 \times \frac{250}{365} = \$235.07 & \text{c. } \$1,500 \times .08 \times \frac{122}{365} = \$40.11 \end{array}$$

3. Find the simple interest for each of the following loans using the ordinary interest method (Banker's Rule).

Principal	Rate	Time	Interest	
a. \$5,250	$7\frac{1}{2}\%$	120 days	<u>\$131.25</u>	October 17 290
b. \$700	3%	70 days	<u>\$4.08</u>	June 15 - 166
c. \$2,600	11%	Made on June 15 Due October 17	<u>\$98.51</u>	124

$$\begin{array}{lll} \text{a. } \$5,250 \times .075 \times \frac{120}{360} = \$131.25 & \text{b. } \$700 \times .03 \times \frac{70}{360} = \$4.08 & \text{c. } \$2,600 \times .11 \times \frac{124}{360} = \$98.51 \end{array}$$

WORD PROBLEMS

4. On October 17, Gill Iowa borrowed \$6,000 at a rate of 4%. She promised to repay the loan in 7 months. What are (a) the amount of the simple interest and (b) the total amount owed upon maturity?

$$\begin{array}{ll} \text{a. } \$6,000 \times .04 \times \frac{7}{12} = \$140.00 \text{ interest} & \text{b. } \$6,000 + \$140.00 = \$6,140.00 \text{ maturity value} \end{array}$$

5. Marjorie Folsom borrowed \$5,500 to purchase a computer. The loan was for 9 months at an annual interest rate of $12\frac{1}{2}\%$. What are (a) the amount of interest Marjorie must pay and (b) the maturity value of the loan?

$$\begin{array}{ll} \text{a. } \$5,500 \times .125 \times \frac{9}{12} = \$515.63 \text{ interest} & \text{b. } \$5,500 + \$515.63 = \$6,015.63 \text{ maturity value} \end{array}$$

6. Eric has a loan for \$1,200 at an ordinary interest rate of 9.5% for 80 days. Julie has a loan for \$1,200 at an exact interest rate of 9.5% for 80 days. Calculate (a) the total amount due on Eric's loan and (b) the total amount due on Julie's loan.

a. $\$1,200 \times .095 \times \frac{80}{360} = \25.33 interest $\$1,200 + \$25.33 = \$1,225.33$ maturity value of Eric's loan

b. $\$1,200 \times .095 \times \frac{80}{365} = \24.99 interest $\$1,200 + \$24.99 = \$1,224.99$ maturity value of Julie's loan

7. Roger Lee borrowed \$5,280 at $13\frac{1}{2}\%$ on May 24 and agreed to repay the loan on August 24. The lender calculates interest using the exact interest method. How much will Roger be required to pay on August 24?

August 24 – May 24

$236 - 144 = 92$ days $\$5,280 \times .135 \times \frac{92}{365} = \179.66 interest
 $\$5,280 + \$179.66 = \$5,459.66$ maturity value, due August 24

8. On March 8, Jack Faltin borrowed \$10,225 at $9\frac{3}{4}\%$. He signed a note agreeing to repay the loan and interest on November 8. If the lender calculates interest using the ordinary interest method, what will Jack's repayment be?

November 8 – March 8

$312 - 67 = 245$ days $\$10,225 \times .0975 \times \frac{245}{360} = \678.47 interest
 $\$10,225 + \$678.47 = \$10,903.47$ maturity value, due November 8

9. Ifeyinwa Achebe's real estate taxes of \$641.49 were due on November 1, 2022. Due to financial difficulties, Ifeyinwa was unable to pay her tax bill until January 15, 2023. The penalty for late payment is $13\frac{3}{8}\%$ ordinary interest. What is the penalty Ifeyinwa will have to pay, and what is Ifeyinwa's total payment on January 15?

December 31 – November 1 + January 15

$365 - 305 = 60 + 15 = 75$ days $\$641.49 \times .13375 \times \frac{75}{360} = \17.87 penalty
 $\$641.49 + \$17.87 = \$659.36$ total due on January 15

10. On August 8, Rex Eason had a credit card balance of \$550, but he was unable to pay his bill. The credit card company charges interest of $18\frac{1}{2}\%$ annually on late payments. What amount will Rex have to pay if he pays his bill 1 month late?

$\$550 + \left(\$550 \times .185 \times \frac{1}{12} \right) = \558.48 (principal + interest)

11. An issue of *Your Money* discussed average consumers who carry a balance of \$2,000 on one credit card. If the yearly rate of interest is 18%, how much are consumers paying in interest per year?

$P = \$2,000, R = 18\%, T = 1$ year $\begin{matrix} (P) & (R) & (T) & (I) \\ \$2,000 \times .18 \times 1 = \$360 \end{matrix}$

12. AFBA Industrial Bank of Colorado Springs, Colorado, charges a credit card interest rate of 11% per year. If you had a credit card debt of \$1,500, what would your interest amount be after 3 months?

$P = \$1,500, R = 11\%, T = 3$ months $\$1,500 \times .11 \times \frac{3}{12} = \41.25

Learning Unit 10–2: Finding Unknown in Simple Interest Formula

DRILL PROBLEMS

1. Find the principal in each of the following. Round to the nearest cent. Assume 360 days. *Calculator hint:* Do denominator calculation first, and do not round; when answer is displayed, save it in memory by pressing [M+]. Now key in the numerator (interest amount), [$\div$], [MR], [=] for the answer. Be sure to clear memory after each problem by pressing [MR] again so that the M is no longer in the display.

Rate	Time	Interest	Principal
a. 8%	70 days	\$68	<u>\$ 4,371.44</u>
b. 11%	90 days	\$125	<u>\$ 4,545.45</u>
c. 9%	120 days	\$103	<u>\$ 3,433.33</u>
d. $8\frac{1}{2}\%$	60 days	\$150	<u>\$10,588.29</u>

a. $\frac{\$68}{.08 \times \frac{70}{360}} = \frac{\$68}{.0155555} = \$4,371.44$

b. $\frac{\$125}{.11 \times \frac{90}{360}} = \frac{\$125}{.0275} = \$4,545.45$

c. $\frac{\$103}{.09 \times \frac{120}{360}} = \frac{\$103}{.03} = \$3,433.33$

d. $\frac{\$150}{.085 \times \frac{60}{360}} = \frac{\$150}{.0141666} = \$10,588.29$

2. Find the rate in each of the following. Round to the nearest tenth of a percent. Assume 360 days.

Principal	Time	Interest	Rate
a. \$7,500	120 days	\$350	<u>14%</u>
b. \$975	60 days	\$25	<u>15.4%</u>
c. \$20,800	220 days	\$910	<u>7.2%</u>
d. \$150	30 days	\$2.10	<u>16.8%</u>

$$\text{a. } \frac{\$350}{\$7,500 \times \frac{120}{360}} = \frac{\$350}{\$2,500} = .14$$

$$\text{b. } \frac{\$25}{\$975 \times \frac{60}{360}} = \frac{\$25}{\$162.5} = .1538$$

$$\text{c. } \frac{\$910}{\$20,800 \times \frac{220}{360}} = \frac{\$910}{\$12,711.11} = .0716$$

$$\text{d. } \frac{\$2.10}{\$150 \times \frac{30}{360}} = \frac{\$2.10}{\$12.5} = .168$$

3. Find the time (to the nearest day) in each of the following. Assuming ordinary interest, use 360 days.

Principal	Rate	Interest	Time (days)	Time (years) (Round to nearest hundredth)
a. \$400	11%	\$7.33	<u>60</u>	<u>.17</u>
b. \$7,000	12.5%	\$292	<u>120</u>	<u>.33</u>
c. \$1,550	9.2%	\$106.95	<u>270</u>	<u>.75</u>
d. \$157,000	10.75%	\$6,797.88	<u>145</u>	<u>.40</u>

$$\text{a. } \frac{\$7.33}{\$400 \times .11} = \frac{\$7.33}{\$44} \times 360 = 59.9$$

$$\text{b. } \frac{\$292}{\$7,000 \times .125} = \frac{\$292}{\$875} \times 360 = 120.1$$

$$\text{c. } \frac{\$106.95}{\$1,550 \times .092} = \frac{\$106.95}{\$142.6} \times 360 = 270$$

$$\text{d. } \frac{\$6,797.88}{\$157,000 \times .1075} = \frac{\$6,797.88}{\$16,877.50} \times 360 = 144.9$$

4. Complete the following. Assume 360 days for all examples.

Principal	Rate (nearest tenth percent)	Time (nearest day)	Simple interest
a. \$345	<u>10%</u>	150 days	\$14.38
b. <u>\$1,500.16</u>	12.5%	90 days	\$46.88
c. \$750	12.2%	<u>75 days</u>	\$19.06
d. \$20,260	16.7%	110 days	<u>\$1,033.82</u>

$$\text{a. } \frac{\$14.38}{\$345 \times \frac{150}{360}} = \frac{\$14.38}{\$143.75} = .1000$$

$$\text{b. } \frac{\$46.88}{.125 \times \frac{90}{360}} = \frac{\$46.88}{.03125} = \$1,500.16$$

$$\text{c. } \frac{\$19.06}{\$750 \times .122} = \frac{\$19.06}{\$91.5} \times 360 = 74.9$$

$$\text{d. } \$20,260 \times .167 \times \frac{110}{360} = \$1,033.822$$

WORD PROBLEMS

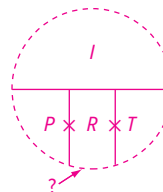
Use 360 days.

5. In June, Becky opened a \$20,000 bank CD paying 1% interest, but she had to withdraw the money in a few days to cover one child's college tuition. The bank charged her \$1,000 in penalties for the withdrawal. What percent of the \$20,000 was she charged?

$$P = \$20,000$$

$$I \text{ (penalty)} = \$1,000$$

$$\frac{\$1,000 \text{ interest}}{\$20,000} = 5\%$$



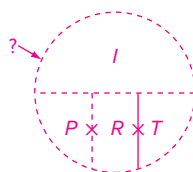
6. Dr. Vaccarro invested their money at $12\frac{1}{2}\%$ for 175 days and earned interest of \$760. How much money did Dr. Vaccarro invest?

$$\frac{\$760}{.125 \times \frac{175}{360}} = \frac{\$760}{.0607638} = \$12,507.446 = \$12,507.45$$

7. If you invested \$10,000 at 5% interest in a 6-month CD compounding interest daily, you would earn \$252.43 in interest. How much would the same \$10,000 invested in a bank paying simple interest earn?

$$(P) \quad (R) \quad (T) \quad (I)$$

$$\$10,000 \times .05 \times \frac{6}{12} = \$250$$



8. Thomas Kyrouz opened a savings account and deposited \$750 in a bank that was paying 2.5% simple interest. How much were his savings worth in 200 days?

$$\$750 \times .025 \times \frac{200}{360} = \$10.42 \quad \$750 + \$10.42 = \$760.42$$

9. Mary Millitello paid the bank \$53.90 in interest on a 66-day loan at 9.8%. How much money did Mary borrow? Round to the nearest dollar.

$$\frac{\$53.90}{.098 \times \frac{66}{360}} = \frac{\$53.90}{.0179666} = \$3,000$$

10. If Anthony Lucido deposits \$2,400 for 66 days and makes \$60.72 in interest, what interest rate is he receiving?

$$\frac{\$60.72}{\$2,400 \times \frac{66}{360}} = \frac{\$60.72}{\$440} = .138 = 13.8\%$$

11. Find how long in days David Wong must invest \$23,500 of his company's cash at 8.4% in order to earn \$652.50 in interest.

$$\frac{\$652.50}{\$23,500 \times .084} = \frac{\$652.50}{\$1,974} \times 360 = 118.99 = 119 \text{ days}$$

Learning Unit 10–3: U.S. Rule—Making Partial Note Payments before Due Date

DRILL PROBLEMS

1. A merchant borrowed \$3,000 for 320 days at 11% (assume a 360-day year). Use the U.S. Rule to complete the following table:

Payment number	Payment day	Amount paid	Interest to date	Principal payment	Adjusted balance
					\$3,000
1	75	\$500	\$68.75	\$431.25	\$2,568.75
2	160	\$750	\$66.72	\$683.28	\$1,885.47
3	220	\$1,000	\$34.57	\$965.43	\$ 920.04
4	320	\$948.15	\$28.11	\$920.04	\$ 0

$$1. \quad \$3,000 \times .11 \times \frac{75}{360} = \$68.75; \quad \$500 - \$68.75 = \$431.25$$

$$\$3,000 - \$431.25 = \$2,568.75$$

$$2. \quad 160 - 75 = 85 \text{ days}$$

$$\$2,568.75 \times .11 \times \frac{85}{360} = \$66.72; \quad \$750 - \$66.72 = \$683.28$$

$$\$2,568.75 - \$683.28 = \$1,885.47$$

$$3. \quad 220 - 160 = 60 \text{ days}$$

$$\$1,885.47 \times .11 \times \frac{60}{360} = \$34.57; \quad \$1,000 - \$34.57 = \$965.43$$

$$\$1,885.47 - \$965.43 = \$920.04$$

$$4. \quad 320 - 220 = 100 \text{ days}$$

$$\$920.04 \times .11 \times \frac{100}{360} = \$28.11; \quad \$920.04 + \$28.11 = \$948.15$$

2. Use the U.S. Rule to solve for total interest costs, balances, and final payments; use ordinary interest.

Given

Principal, \$6,000, 5%, 100 days

Partial payments on 30th day, \$2,000

on 70th day, \$1,000

5%, 30 days, \$6,000

$$I = \$6,000 \times .05 \times \frac{30}{360} = \$25$$

\$2,000	\$6,000	\$3,047.36
<u>- 25</u>	<u>- 1,975</u>	<u>+ 12.70</u>
\$1,975	\$4,025	\$3,060.06

$$\$4,025 \times .05 \times \frac{40}{360} = \$22.36$$

		Interest paid
\$1,000.00	\$4,025.00	\$25.00
<u>- 22.36</u>	<u>- 977.64</u>	<u>22.36</u>
\$ 977.64	\$3,047.36	<u>12.70</u>
		\$60.06

$$\$3,047.36 \times .05 \times \frac{30}{360} = \$12.70$$

WORD PROBLEMS

3. John Joseph borrowed \$10,800 for 1 year at 14%. After 60 days, he paid \$2,500 on the note. On the 200th day, he paid an additional \$5,000. Use the U.S. Rule and ordinary interest to find the final balance due.

$$\$10,800 \times .14 \times \frac{60}{360} = \$252; \$2,500 - \$252 = \$2,248; \$10,800 - \$2,248 = \$8,552$$

$$200 - 60 = 140 \text{ days}; \$8,552 \times .14 \times \frac{140}{360} = \$465.61; \$5,000 - \$465.61 = \$4,534.39;$$

$$\$8,552 - \$4,534.39 = \$4,017.61$$

$$360 - 200 = 160; \$4,017.61 \times .14 \times \frac{160}{360} = \$249.98;$$

$$\$4,017.61 + \$249.98 = \$4,267.59 \text{ final balance due}$$

4. Doris Davis borrowed \$8,200 on March 5 for 90 days at $8\frac{3}{4}\%$. After 32 days, Doris made a payment on the loan of \$2,700. On the 65th day, she made another payment of \$2,500. What is her final payment if you use the U.S. Rule with ordinary interest?

$$\$8,200 \times .0875 \times \frac{32}{360} = \$63.78; \$2,700 - \$63.78 = \$2,636.22$$

$$\$8,200 - \$2,636.22 = \$5,563.78$$

$$65 - 32 = 33 \text{ days}; \$5,563.78 \times .0875 \times \frac{33}{360} = \$44.63;$$

$$\$2,500 - \$44.63 = \$2,455.37; \$5,563.78 - \$2,455.37 = \$3,108.41$$

$$90 - 65 = 25 \text{ days}; \$3,108.41 \times .0875 \times \frac{25}{360} = \$18.89;$$

$$\$3,108.41 + \$18.89 = \$3,127.30 \text{ final payment}$$

5. Owen Tokpah borrowed \$6,000 on a 13%, 60-day note. After 10 days, David paid \$500 on the note. On day 40, David paid \$900 on the note. What are the total interest and ending balance due by the U.S. Rule? Use ordinary interest.

U.S. Rule

$$\$6,000 \times .13 \times \frac{10}{360} = \$21.67$$

$$\begin{array}{r} \$500.00 \\ -21.67 \\ \hline \$478.33 \end{array} \quad \begin{array}{r} \$6,000.00 \leftarrow \text{Principal} \\ -478.33 \\ \hline \end{array}$$

$$\begin{array}{r} \$478.33 \\ -59.82 \\ \hline \$840.18 \end{array} \quad \begin{array}{r} \$5,521.67 \leftarrow \text{Adjusted balance (principal)} \\ -840.18 \\ \hline \end{array}$$

$$\$5,521.67 \times .13 \times \frac{30}{360} = \$59.82$$

$$\begin{array}{r} \$900.00 \\ -59.82 \\ \hline \$840.18 \end{array} \quad \begin{array}{r} \$5,521.67 \\ -840.18 \\ \hline \$4,681.49 \end{array}$$

$$\$4,681.49 \times .13 \times \frac{20}{360} = \$33.81$$

$$\begin{array}{r} \$4,681.49 \\ +33.81 \\ \hline \$4,715.30 \leftarrow \text{Ending balance due} \end{array} \quad \begin{array}{r} \$21.67 \\ 59.82 \\ +33.81 \\ \hline \$115.30 \leftarrow \text{Total interest} \end{array}$$

Learning Unit 11–1: Structure of Promissory Notes; the Simple Discount Note**DRILL PROBLEMS**

1. Identify each of the following characteristics of promissory notes with an **I** for simple interest note, a **D** for simple discount note, or a **B** if it is true for both.

I Interest is computed on face value, or what is actually borrowed.

B A promissory note for a loan usually less than 1 year.

D Borrower receives proceeds = Face value – Bank discount.

I Maturity value = Face value + Interest.

D Maturity value = Face value.

I Borrower receives the face value.

B Paid back by one payment at maturity.

D Interest computed on maturity value, or what will be repaid, and not on actual amount borrowed.

2. Find the bank discount and the proceeds for the following; assume 360 days:

Maturity value	Discount rate	Time (days)	Bank discount	Proceeds
a. \$8,000	3%	120	<u>\$80</u>	<u>\$7,920</u>
b. \$4,550	8.1%	110	<u>\$112.61</u>	<u>\$4,437.39</u>
c. \$19,350	12.7%	55	<u>\$375.44</u>	<u>\$18,974.56</u>
d. \$63,400	10%	90	<u>\$1,585</u>	<u>\$61,815</u>
e. \$13,490	7.9%	200	<u>\$592.06</u>	<u>\$12,897.94</u>
f. \$780	$12\frac{1}{2}\%$	65	<u>\$17.60</u>	<u>\$762.40</u>

$$\text{a. } \$8,000 \times .03 \times \frac{120}{360} = \$80; \$8,000 - \$80 = \$7,920$$

$$\text{b. } \$4,550 \times .081 \times \frac{110}{360} = \$112.61; \$4,550 - \$112.61 = \$4,437.39$$

$$\text{c. } \$19,350 \times .127 \times \frac{55}{360} = \$375.44; \$19,350 - \$375.44 = \$18,974.56$$

$$\text{d. } \$63,400 \times .10 \times \frac{90}{360} = \$1,585; \$63,400 - \$1,585 = \$61,815$$

$$\text{e. } \$13,490 \times .079 \times \frac{200}{360} = \$592.06; \$13,490 - \$592.06 = \$12,897.94$$

$$\text{f. } \$780 \times .125 \times \frac{65}{360} = \$17.60; \$780 - \$17.60 = \$762.40$$

3. Find the effective rate of interest for each of the loans in Problem 2. Use the answers you calculated in Problem 2 to solve these problems; round to the nearest tenth percent.

Maturity value	Discount rate	Time (days)	Effective rate
a. \$8,000	3%	120	<u>3%</u>
b. \$4,550	8.1%	110	<u>8.3%</u>
c. \$19,350	12.7%	55	<u>13%</u>
d. \$63,400	10%	90	<u>10.3%</u>
e. \$13,490	7.9%	200	<u>8.3%</u>
f. \$780	$12\frac{1}{2}\%$	65	<u>12.8%</u>

a. $\frac{\$80}{\$7,920 \times \frac{120}{360}} = .0303 = 3\%$	b. $\frac{\$112.61}{\$4,437.39 \times \frac{110}{360}} = .0830 = 8.3\%$
c. $\frac{\$375.44}{\$18,974.56 \times \frac{55}{360}} = .1295 = 13\%$	d. $\frac{\$1,585}{\$61,815 \times \frac{90}{360}} = .1026 = 10.3\%$
e. $\frac{\$592.06}{\$12,897.94 \times \frac{200}{360}} = .0826 = 8.3\%$	f. $\frac{\$17.60}{\$762.40 \times \frac{65}{360}} = .1279 = 12.8\%$

WORD PROBLEMS

Assume 360 days.

4. Kaylee Putty signed an \$8,000 note for 140 days at a discount rate of 5%. Find the discount and the proceeds Kaylee received.
- $$\$8,000 \times .05 \times \frac{140}{360} = \$155.56 \text{ discount}$$
- $$\$8,000 - \$155.56 = \$7,844.44 \text{ proceeds}$$
5. The Salem Cooperative Bank charges an $8\frac{3}{4}\%$ discount rate. What are the discount and the proceeds for a \$16,200 note for 60 days?
- $$\$16,200 \times .0875 \times \frac{60}{360} = \$236.25 \text{ discount}$$
- $$\$16,200 - \$236.25 = \$15,963.75 \text{ proceeds}$$
6. Bill Jackson is planning to buy a used car. He went to City Credit Union to take out a loan for \$6,400 for 300 days. If the credit union charges a discount rate of $11\frac{1}{2}\%$, what will the proceeds of this loan be?
- $$\$6,400 \times .115 \times \frac{300}{360} = \$613.33; \$6,400 - \$613.33 = \$5,786.67 \text{ proceeds}$$
7. Mike Drislane goes to the bank and signs a note for \$9,700. The bank charges a 15% discount rate. Find the discount and the proceeds if the loan is for 210 days.
- $$\$9,700 \times .15 \times \frac{210}{360} = \$848.75 \text{ discount}$$
- $$\$9,700 - \$848.75 = \$8,851.25 \text{ proceeds}$$
8. Flora Foley plans to have a deck built on the back of her house. She decides to take out a loan at the bank for \$14,300. She signs a note promising to pay back the loan in 280 days. If the note was discounted at 9.2%, how much money will Flora receive from the bank?
- $$\$14,300 \times .092 \times \frac{280}{360} = \$1,023.24$$
- $$\$14,300 - \$1,023.24 = \$13,276.76 \text{ proceeds Flora receives}$$
9. At the end of 280 days, Flora (Problem 8) must pay back the loan. What is the maturity value of the loan?
- \$14,300 maturity value**
10. Dave Cassidy signed a \$7,855 note at a bank that charges a 14.2% discount rate. If the loan is for 190 days, find (a) the proceeds and (b) the effective rate charged by the bank (to the nearest tenth percent).
- a. $\$7,855 \times .142 \times \frac{190}{360} = \588.69
- $$\$7,855 - \$588.69 = \$7,266.31 \text{ proceeds}$$
- b. $\frac{\$588.69}{\$7,266.31 \times \frac{190}{360}} = .1535 = 15.4\% \text{ effective rate}$
11. How much money must Dave (Problem 10) pay back to the bank?
- Dave pays back \$7,855.**

Learning Unit 11–2: Discounting an Interest-Bearing Note before Maturity**DRILL PROBLEMS**

1. Calculate the maturity value for each of the following promissory notes; use 360 days:

Date of note	Principal of note	Length of note (days)	Interest rate	Maturity value
a. June 9	\$5,000	180	3%	<u>\$5,075.00</u>
b. August 23	\$15,990	85	13%	<u>\$16,480.80</u>
c. December 10	\$985	30	11.5%	<u>\$994.44</u>

$$\text{a. } \$5,000 \times .03 \times \frac{180}{360} = \$75 + \$5,000 = \$5,075.00$$

$$\text{b. } \$15,990 \times .13 \times \frac{85}{360} = \$490.80 + \$15,990 = \$16,480.80$$

$$\text{c. } \$985 \times .115 \times \frac{30}{360} = \$9.44 + \$985 = \$994.44$$

2. Find the maturity date and the discount period for the following; assume no leap years.
- Hint:*
- See Exact Days-in-a-Year Calendar, Chapter 7.

Date of note	Length of note (days)	Date of discount	Maturity date	Discount period
a. March 11	200	June 28	<u>September 27</u>	<u>91 days</u>
b. January 22	60	March 2	<u>March 23</u>	<u>21 days</u>
c. April 19	85	June 6	<u>July 13</u>	<u>37 days</u>
d. November 17	120	February 15	<u>March 17</u>	<u>30 days</u>

$$\text{a. } 70 + 200 = 270 = \text{September 27}; 270 - 179 = 91 \text{ days or } 200 - (20 + 30 + 31 + 28) = 91$$

$$\text{b. } 22 + 60 = 82 = \text{March 23}; 82 - 61 = 21 \text{ days or } 60 - (9 + 28 + 2) = 21$$

$$\text{c. } 109 + 85 = 194 = \text{July 13}; 194 - 157 = 37 \text{ days or } 85 - (11 + 31 + 6) = 37$$

$$\text{d. } 365 - 321 = 44; 120 - 44 = 76 = \text{March 17}; 76 - 46 = 30 \text{ days or } 120 - (13 + 31 + 31 + 15) = 30$$

3. Find the bank discount for each of the following; use 360 days:

Date of note	Principal of note	Length of note	Interest rate	Bank discount rate	Date of discount	Bank discount
a. October 5	\$2,475	88 days	11%	9.5%	December 10	<u>\$14.76</u>
b. June 13	\$9,055	112 days	15%	16%	August 11	<u>\$223.25</u>
c. March 20	\$1,065	75 days	12%	11.5%	May 24	<u>\$3.49</u>

$$\text{a. Maturity value} = \$2,475 \times .11 \times \frac{88}{360} = \$66.55 + \$2,475 = \$2,541.55$$

$$\text{Discount period} = 88 - (26 + 30 + 10) = 22 \text{ days}$$

$$\text{Bank discount} = \$2,541.55 \times .095 \times \frac{22}{360} = \$14.76$$

$$\text{b. Maturity value} = \$9,055 \times .15 \times \frac{112}{360} = \$422.57 + \$9,055 = \$9,477.57$$

$$\text{Discount period} = 112 - (17 + 31 + 11) = 53 \text{ days}$$

$$\text{Bank discount} = \$9,477.57 \times .16 \times \frac{53}{360} = \$223.25$$

$$\text{c. Maturity value} = \$1,065 \times .12 \times \frac{75}{360} = \$26.63 + \$1,065 = \$1,091.63$$

$$\text{Discount period} = 75 - (11 + 30 + 24) = 10 \text{ days}$$

$$\text{Bank discount} = \$1,091.63 \times .115 \times \frac{10}{360} = \$3.49$$

4. Find the proceeds for each of the discounted notes in Problem 3.

a. $\underline{\$2,526.79}$	a. $\$2,541.55 - \$14.76 = \$2,526.79$
b. $\underline{\$9,254.32}$	b. $\$9,477.57 - \$223.25 = \$9,254.32$
c. $\underline{\$1,088.14}$	c. $\$1,091.63 - \$3.49 = \$1,088.14$

WORD PROBLEMS

5. Connors Company received a \$4,000, 90-day, 10% note dated April 6 from one of its customers. Connors Company held the note until May 16, when the company discounted it at a bank at a discount rate of 12%. What were the proceeds that Connors Company received?

$$\$4,000 \times .10 \times \frac{90}{360} = \$100 + \$4,000 = \$4,100$$

$$90 - (24 + 16) = 50 \text{ days} \quad \$4,100 \times .12 \times \frac{50}{360} = \$68.33; \$4,100 - \$68.33 = \$4,031.67$$

6. Souza & Sons accepted a 9%, \$22,000, 120-day note from one of its customers on July 22. On October 2, the company discounted the note at Cooperative Bank. The discount rate was 12%. What were (a) the bank discount and (b) the proceeds?

$$\$22,000 \times .09 \times \frac{120}{360} = \$660 + \$22,000 = \$22,660 \quad \$22,660 \times .12 \times \frac{48}{360} = \$362.56 \text{ bank discount}$$

$$120 - (9 + 31 + 30 + 2) = 48 \text{ days} \quad \$22,660 - \$362.56 = \$22,297.44 \text{ proceeds}$$

7. The Fargate Store accepted an \$8,250, 75-day, 9% note from one of its customers on March 18. Fargate discounted the note at Parkside National Bank at $9\frac{1}{2}\%$ on March 29. What proceeds did Fargate receive?

$$\$8,250 \times .09 \times \frac{75}{360} = \$154.69 + \$8,250 = \$8,404.69$$

$$75 - 11 = 64 \text{ days} \quad \$8,404.69 \times .095 \times \frac{64}{360} = \$141.95; \$8,404.69 - \$141.95 = \$8,262.74$$

8. On November 1, Marjorie's Clothing Store accepted a \$5,200, $8\frac{1}{2}\%$, 90-day note from Maryam Bachir in granting her a time extension on her bill. On January 13, Marjorie's discounted the note at Seawater Bank, which charged a 10% discount rate. What were the proceeds that Marjorie's received?

$$\$5,200 \times .085 \times \frac{90}{360} = \$110.50 + \$5,200 = \$5,310.50$$

$$90 - (29 + 31 + 13) = 17 \quad \$5,310.50 \times .10 \times \frac{17}{360} = \$25.08; \$5,310.50 - \$25.08 = \$5,285.42$$

9. On December 3, Duncan's Company accepted a \$5,000, 90-day, 12% note from Al Finney in exchange for a \$5,000 bill that was past due. On January 29, Duncan's discounted the note at The Sidwell Bank at 13.1%. What were the proceeds from the note?

$$\$5,000 \times .12 \times \frac{90}{360} = \$150 + \$5,000 = \$5,150$$

$$90 - (28 + 29) = 33 \text{ days} \quad \$5,150 \times .131 \times \frac{33}{360} = \$61.84; \$5,150 - \$61.84 = \$5,088.16$$

10. On February 26, Sullivan Company accepted a 60-day, 10% note in exchange for a \$1,500 past-due bill from Tabot Company. On March 28, Sullivan Company discounted at National Bank the note received from Tabot Company. The bank discount rate was 12%. What are (a) the bank discount and (b) the proceeds?

$$\$1,500 \times .10 \times \frac{60}{360} = \$25 + \$1,500 = \$1,525 \quad \text{a. } \$1,525 \times .12 \times \frac{30}{360} = \$15.25 \text{ bank discount}$$

$$60 - (2 + 28) = 30 \text{ days} \quad \text{b. } \$1,525 - \$15.25 = \$1,509.75 \text{ proceeds}$$

11. On June 4, Johnson Company received from Marty Russo a 30-day, 11% note for \$720 to settle Russo's debt. On June 17, Johnson discounted the note at Eastern Bank at 15%. What proceeds did Johnson receive?

$$\$720 \times .11 \times \frac{30}{360} = \$6.60 + \$720 = \$726.60$$

$$30 - 13 = 17 \text{ days} \quad \$726.60 \times .15 \times \frac{17}{360} = \$5.15; \$726.60 - \$5.15 = \$721.45$$

12. On December 15, Lawlers Company went to the bank and discounted a 10%, 90-day, \$14,000 note dated October 21. The bank charged a discount rate of 12%. What were the proceeds of the note?

$$\$14,000 \times .10 \times \frac{90}{360} = \$350 + \$14,000 = \$14,350$$

$$90 - (10 + 30 + 15) = 35 \text{ days} \quad \$14,350 \times .12 \times \frac{35}{360} = \$167.42; \$14,350 - \$167.42 = \$14,182.58$$

Learning Unit 12–1: Compound Interest (Future Value)—The Big Picture**DRILL PROBLEMS**

1. In the following examples, calculate manually the amount at year-end for each of the deposits, assuming that interest is compounded annually. Round to the nearest cent each year.

Principal	Rate	Number of years	Year 1	Year 2	Year 3	Year 4
a. \$530	4%	2	<u>\$551.20</u>	<u>\$573.25</u>		
b. \$1,980	12%	4	<u>\$2,217.60</u>	<u>\$2,483.71</u>	<u>\$2,781.76</u>	<u>\$3,115.57</u>

a. $\$530 \times 1.04 = \551.20 ; $\$551.20 \times 1.04 = \573.25

b. $\$1,980 \times 1.12 = \$2,217.60$; $\$2,217.60 \times 1.12 = \$2,483.71$; $\$2,483.71 \times 1.12 = \$2,781.76$; $\$2,781.76 \times 1.12 = \$3,115.57$

2. In the following examples, calculate the simple interest, the compound interest, and the difference between the two. Round to the nearest cent; do not use tables.

Principal	Rate	Number of years	Simple interest	Compound interest	Difference
a. \$4,600	10%	2	<u>\$920</u>	<u>\$966</u>	<u>\$46</u>
b. \$18,400	9%	4	<u>\$6,624</u>	<u>\$7,573.10</u>	<u>\$949.10</u>
c. \$855	$7\frac{1}{5}\%$	3	<u>\$184.68</u>	<u>\$198.30</u>	<u>\$13.62</u>

a. $\$4,600 \times .10 \times 2 = \920 ; $\$4,600 \times 1.1 \times 1.1 = \$5,566$; $\$5,566 - \$4,600 = \$966$; $\$966 - \$920 = \$46$

b. $\$18,400 \times .09 \times 4 = \$6,624$; $\$18,400 \times 1.09 \times 1.09 \times 1.09 \times 1.09 = \$25,973.10$; $\$25,973.10 - \$18,400 = \$7,573.10$; $\$7,573.10 - \$6,624 = \$949.10$

c. $\$855 \times .072 \times 3 = \184.68 ; $\$855 \times 1.072 \times 1.072 \times 1.072 = \$1,053.30$; $\$1,053.30 - \$855 = \$198.30$; $\$198.30 - \$184.68 = \$13.62$

3. Find the future value and the compound interest using the Future Value of \$1 at Compound Interest table or the Compound Daily table. Round to the nearest cent.

Principal	Investment terms	Future value	Compound interest
a. \$20,000	6 years at 4% compounded annually	<u>\$25,306</u>	<u>\$5,306</u>
b. \$10,000	6 years at 8% compounded quarterly	<u>\$16,084</u>	<u>\$6,084</u>
c. \$8,400	7 years at 12% compounded semiannually	<u>\$18,991.56</u>	<u>\$10,591.56</u>
d. \$2,500	15 years at 10% compounded daily	<u>\$11,202</u>	<u>\$8,702</u>
e. \$9,600	5 years at 6% compounded quarterly	<u>\$12,930.24</u>	<u>\$3,330.24</u>
f. \$20,000	2 years at 6% compounded monthly	<u>\$22,544</u>	<u>\$2,544</u>

a. $\$20,000 \times 1.2653 = \$25,306$; $\$25,306 - \$20,000 = \$5,306$ (4%, 6 periods)

b. $\$10,000 \times 1.6084 = \$16,084$; $\$16,084 - \$10,000 = \$6,084$ (2%, 24 periods)

c. $\$8,400 \times 2.2609 = \$18,991.56$; $\$18,991.56 - \$8,400 = \$10,591.56$ (6%, 14 periods)

d. $\$2,500 \times 4.4808 = \$11,202$; $\$11,202 - \$2,500 = \$8,702$

e. $\$9,600 \times 1.3469 = \$12,930.24$; $\$12,930.24 - \$9,600 = \$3,330.24$

f. $\$20,000 \times 1.1272 = \$22,544$; $\$22,544 - \$20,000 = \$2,544$

4. Calculate the effective rate (APY) of interest using the Future Value of \$1 at Compound Interest table.

Investment terms	Effective rate (annual percentage yield)
a. 12% compounded quarterly	<u>12.55%</u>
b. 12% compounded semiannually	<u>12.36%</u>
c. 6% compounded quarterly	<u>6.14%</u>

a. $\frac{12\%}{4} = 3\%$ for 4 periods; $1.1255 - 1.0000 = .1255 = 12.55\%$ $\left(\frac{\$.1255}{\$1.000} = \frac{\text{Int. per/year}}{\text{Principal}} \right)$

b. $\frac{12\%}{2} = 6\%$ for 2 periods; $1.1236 - 1.0000 = .1236 = 12.36\%$

c. $\frac{6\%}{4} = 1\frac{1}{2}\%$ for 4 periods; $1.0614 - 1.0000 = .0614 = 6.14\%$

WORD PROBLEMS

5. John Mackey deposited \$7,000 in his savings account at Salem Savings Bank. If the bank pays 2% interest compounded semiannually, what will be the balance of his account at the end of 3 years?
 $\$7,000 \times 1.0615 = \$7,430.50$ (1%, 6 periods)
6. Pine Valley Savings Bank offers a certificate of deposit at 12% interest compounded quarterly. What is the effective rate (APY) of interest?
 $1.1255 - 1.0000 = .1255 = 12.55\%$ (3%, 4 periods)
7. Jack Billings loaned \$6,000 to his brother-in-law Dan, who was opening a new business. Dan promised to repay the loan at the end of 5 years, with interest of 8% compounded semiannually. How much will Dan pay Jack at the end of 5 years?
 $\$6,000 \times 1.4802 = \$8,881.20$ (4%, 10 periods)
8. Eileen Hogarty deposits \$5,630 in City Bank, which pays 12% interest compounded quarterly. How much money will Eileen have in her account at the end of 7 years?
 $\$5,630 \times 2.2879 = \$12,880.88$ (3%, 28 periods)
9. If Kevin Luna deposits \$3,500 in Scarsdale Savings Bank, which pays 8% interest compounded quarterly, what will be in his account at the end of 6 years? How much interest will he have earned at that time?
 $\$3,500 \times 1.6084 = \$5,629.40$ amount
 $\$5,629.40 - \$3,500 = \$2,129.40$ interest (2%, 24 periods)
10. Arlington Trust pays 6% compounded semiannually. How much interest would be earned on \$7,200 for 1 year?
 $\$7,200 \times 1.0609 = \$7,638.48$ (3%, 2 periods) $\$7,638.48 - \$7,200 = \$438.48$ interest
11. Paladium Savings Bank pays 9% compounded quarterly. Find the amount and the interest on \$3,000 after three quarters. Do not use a table.
 $\$3,000 \times 1.0225 = \$3,067.50$; $\$3,067.50 \times 1.0225 = \$3,136.52$; $\$3,136.52 \times 1.0225 = \$3,207.09$ amount
 $\$3,207.09 - \$3,000 = \$207.09$ interest $\frac{9\%}{4} = 2\frac{1}{4}\%$
12. David Siderski bought an \$8,000 bank certificate paying 4% compounded semiannually. How much money did he obtain upon cashing in the certificate 3 years later?
 $\$8,000 \times 1.1262 = \$9,009.60$ (2%, 6 periods)
13. An issue of *Your Money* showed that the more frequently the bank compounds your money, the better. Consider a \$10,000 investment earning 6% interest in a 5-year certificate of deposit at the following three banks. What would be the interest earned at each bank?
- a. Bank A (simple interest, no compounding)
- b. Bank B (quarterly compounding)
- c. Bank C (daily compounding)
- a. $\$10,000 \times .06 \times 5 = \$3,000$ interest
- b. 5 years $\times 4 = 20$ periods $\frac{6\%}{4} = 1\frac{1}{2}\%$ c. 5 years = 1.3498
- | | |
|---------------------|---------------------|
| $\$10,000$ | $\$10,000$ |
| $\times 1.3469$ | $\times 1.3498$ |
| $\$13,469$ | $\$13,498$ |
| $- 10,000$ | $- 10,000$ |
| $\$ 3,469$ interest | $\$ 3,498$ interest |

Learning Unit 12–2: Present Value—The Big Picture**DRILL PROBLEMS**

1. Use the
- Business Math Handbook*
- to find the table factor for each of the following:

Future value	Rate	Number of years	Compounded	Table value
a. \$1.00	2%	5	Annually	<u>.9804</u>
b. \$1.00	12%	8	Semiannually	<u>.3936</u>
c. \$1.00	6%	10	Quarterly	<u>.5513</u>
d. \$1.00	12%	2	Monthly	<u>.7876</u>
e. \$1.00	8%	15	Semiannually	<u>.3083</u>

a. 2%, 5 periods; .9804 b. 6%, 16 periods; .3936
 c. $1\frac{1}{2}\%$, 40 periods; .5513 d. 1%, 24 periods; .7876
 e. 4%, 30 periods; .3083

2. Use the
- Business Math Handbook*
- to find the table factor and the present value for each of the following:

Future value	Rate	Number of years	Compounded	Table value	Present value
a. \$1,000	2%	6	Semiannually	<u>.7785</u>	<u>\$778.50</u>
b. \$1,000	16%	7	Quarterly	<u>.3335</u>	<u>\$333.50</u>
c. \$1,000	8%	7	Quarterly	<u>.5744</u>	<u>\$574.40</u>
d. \$1,000	8%	7	Semiannually	<u>.5775</u>	<u>\$577.50</u>
e. \$1,000	8%	7	Annually	<u>.5835</u>	<u>\$583.50</u>

a. 1%, 12 periods; $.7785 \times \$1,000 = \778.50 b. 4%, 28 periods; $.3335 \times \$1,000 = \333.50
 c. 2%, 28 periods; $.5744 \times \$1,000 = \574.40 d. 4%, 14 periods; $.5775 \times \$1,000 = \577.50
 e. 8%, 7 periods; $.5835 \times \$1,000 = \583.50

3. Find the present value and the interest earned for the following:

Future value	Number of years	Rate	Compounded	Present value	Interest earned
a. \$2,500	6	8%	Annually	<u>\$1,575.50</u>	<u>\$924.50</u>
b. \$4,600	10	6%	Semiannually	<u>\$2,547.02</u>	<u>\$2,052.98</u>
c. \$12,800	8	10%	Semiannually	<u>\$5,863.68</u>	<u>\$6,936.32</u>
d. \$28,400	7	8%	Quarterly	<u>\$16,312.96</u>	<u>\$12,087.04</u>
e. \$53,050	1	12%	Monthly	<u>\$47,076.57</u>	<u>\$5,973.43</u>

a. 8%, 6; $.6302 \times \$2,500 = \$1,575.50$; $\$2,500 - \$1,575.50 = \$924.50$
 b. 3%, 20; $.5537 \times \$4,600 = \$2,547.02$; $\$4,600 - \$2,547.02 = \$2,052.98$
 c. 5%, 16; $.4581 \times \$12,800 = \$5,863.68$; $\$12,800 - \$5,863.68 = \$6,936.32$
 d. 2%, 28; $.5744 \times \$28,400 = \$16,312.96$; $\$28,400 - \$16,312.96 = \$12,087.04$
 e. 1%, 12; $.8874 \times \$53,050 = \$47,076.57$; $\$53,050 - \$47,076.57 = \$5,973.43$

4. Find the missing amount (present value or future value) for each of the following:

Present value	Investment terms	Future value
a. \$3,500	5 years at 8% compounded annually	<u>\$5,142.55</u>
b. <u>\$4,473</u>	6 years at 12% compounded semiannually	\$9,000
c. \$4,700	9 years at 14% compounded semiannually	<u>\$15,885.53</u>

a. 8%, 5; $1.4693 \times \$3,500 = \$5,142.55$ b. 6%, 12; $.4970 \times \$9,000 = \$4,473$
 c. 7%, 18; $3.3799 \times \$4,700 = \$15,885.53$

WORD PROBLEMS

Solve for future value or present value.

5. Paul Palumbo assumes that he will need to have a new roof put on his house in 4 years. He estimates that the roof will cost him \$17,000 at that time. What amount of money should Paul invest today at 2%, compounded semiannually, to be able to pay for the roof?
2%, 8 periods; $.8535 \times \$17,000 = \$14,509.50$
6. Tilton, a pharmacist, rents his store and has signed a lease that will expire in 3 years. When the lease expires, Tilton wants to buy his own store. He wants to have a down payment of \$35,000 at that time. How much money should Tilton invest today at 6%, compounded quarterly, to yield \$35,000?
 $1\frac{1}{2}\%$, 12 periods; $.8364 \times \$35,000 = \$29,274$
7. Brad Morrissey loans \$8,200 to his brother-in-law. He will be repaid at the end of 5 years, with interest at 10% compounded semiannually. Find out how much he will be repaid.
5%, 10 periods; $1.6289 \times \$8,200 = \$13,356.98$
8. The owner of Waverly Sheet Metal Company plans to buy some new machinery in 6 years. He estimates that the machines he wishes to purchase will cost \$39,700 at that time. What must he invest today at 8%, compounded semiannually, to have sufficient money to purchase the new machines?
4%, 12 periods; $.6246 \times \$39,700 = \$24,796.62$
9. Paul Stevens's grandparents want to buy him a car when he graduates from college in 4 years. They feel that they should have \$27,000 in the bank at that time. How much should they invest at 12%, compounded quarterly, to reach their goal?
3%, 16 periods; $.6232 \times \$27,000 = \$16,826.40$
10. Gilda Nardi deposits \$5,325 in a bank that pays 12% interest compounded quarterly. Find the amount she will have at the end of 7 years.
3%, 28 periods; $2.2879 \times \$5,325 = \$12,183.07$
11. Mary Wilson wants to buy a new set of golf clubs in 2 years. They will cost \$775. How much money should she invest today at 9%, compounded annually, so that she will have enough money to buy the new clubs?
9%, 2 periods; $.8417 \times \$775 = \652.32
12. Jack Beggs plans to invest \$30,000 at 10%, compounded semiannually, for 5 years. What is the future value of the investment?
5%, 10 periods; $1.6289 \times \$30,000 = \$48,867$
13. Ron Thrift expects his Honda Pilot will last 3 more years. Ron does not like to finance his purchases. He went to First National Bank to find out how much money he should put in the bank to purchase a \$20,300 car in 3 years. The bank's 3-year CD is compounded quarterly with a 4% rate. How much should Ron invest in the CD?

$$\begin{array}{rcl}
 3 \text{ years} \times 4 = 12 \text{ periods} & \frac{4\%}{4} = 1\% & \$20,300.00 \\
 & & \times .8874 \\
 & & \hline
 & & \$18,014.22
 \end{array}$$
14. The Downers Grove YMCA had a fund-raising campaign to build a swimming pool in 6 years. Members raised \$825,000; the pool is estimated to cost \$1,230,000. The money will be placed in Downers Grove Bank, which pays daily interest at 6%. Will the YMCA have enough money to pay for the pool in 6 years?

$$\begin{array}{rcl}
 \$825,000 \times 1.4333 = \$1,182,472.50 & \text{Cost:} & \$1,230,000.00 \\
 & \text{Earned:} & \underline{1,182,472.50} \\
 & \text{Short:} & \$ \quad 47,527.50
 \end{array}$$

Learning Unit 13–1: Annuities: Ordinary Annuity and Annuity Due (Find Future Value)

Note to instructor: All worked-out solutions for Chapters 13–22 are located in your Instructor's Resource Manual by chapter.

DRILL PROBLEMS

1. Find the value of the following ordinary annuities; calculate manually:

Amount of each annual deposit	Interest rate	Value at end of year 1	Value at end of year 2	Value at end of year 3
a. \$1,000	8%	<u>\$1,000</u>	<u>\$2,080</u>	<u>\$3,246.40</u>
b. \$2,500	12%	<u>\$2,500</u>	<u>\$5,300</u>	<u>\$8,436</u>
c. \$7,200	10%	<u>\$7,200</u>	<u>\$15,120</u>	<u>\$23,832</u>

2. Use the Ordinary Annuity Table: Compound Sum of an Annuity of \$1 to find the value of the following ordinary annuities:

Annuity payment	Payment period	Term of annuity	Interest rate	Value of annuity
a. \$650	Semiannually	5 years	6%	<u>\$7,451.54</u>
b. \$3,790	Annually	13 years	12%	<u>\$106,230.28</u>
c. \$500	Quarterly	1 year	8%	<u>\$2,060.80</u>

3. Find the annuity due (deposits are made at beginning of period) for each of the following using the Ordinary Annuity Table:

Amount of payment	Payment period	Interest rate	Time (years)	Amount of annuity
a. \$900	Annually	7%	6	<u>\$6,888.60</u>
b. \$1,200	Annually	11%	4	<u>\$6,273.36</u>
c. \$550	Semiannually	10%	9	<u>\$16,246.40</u>

4. Find the amount of each annuity:

Amount of payment	Payment period	Interest rate	Time (years)	Type of annuity	Amount of annuity
a. \$600	Semiannually	12%	8	Ordinary	<u>\$15,403.50</u>
b. \$600	Semiannually	12%	8	Due	<u>\$16,327.68</u>
c. \$1,100	Annually	9%	7	Ordinary	<u>\$10,120.44</u>

WORD PROBLEMS

- At the end of each year for the next 9 years, D'Aldo Company will deposit \$25,000 in an ordinary annuity account paying 9% interest compounded annually. Find the value of the annuity at the end of the 9 years.
\$325,525
- David McCarthy is a professional baseball player who expects to play in the major leagues for 10 years. To save for the future, he will deposit \$50,000 at the beginning of each year into an account that pays 11% interest compounded annually. How much will he have in this account at the end of 10 years?
\$928,070
- Tom and Sue plan to get married. Because they hope to have a large wedding, they are going to deposit \$1,000 at the end of each month into an account that pays 24% compounded monthly. How much will they have in this account at the end of 1 year?
\$13,412
- Chris Dennen deposits \$15,000 at the end of each year for 13 years into an account paying 7% interest compounded annually. What is the value of her annuity at the end of 13 years? How much interest will she have earned?
\$302,109 value \$107,109 interest
- Amanda Blinn is 52 years old today and has just opened an IRA. She plans to deposit \$500 at the end of each quarter into her account. If Amanda retires on her 62nd birthday, what amount will she have in her account if the account pays 8% interest compounded quarterly?
\$30,200.85
- Jerry Davis won the citywide sweepstakes and will receive a check for \$2,000 at the beginning of each 6 months for the next 5 years. If Jerry deposits each check in an account that pays 8% compounded semiannually, how much will he have at the end of 5 years?
\$24,972.60
- Chioma Agwuegbo purchased an ordinary annuity from an investment broker at 8% interest compounded semiannually. If her semiannual deposit is \$600, what will be the value of the annuity at the end of 15 years?
\$33,650.94

Learning Unit 13–2: Present Value of an Ordinary Annuity (Find Present Value)

DRILL PROBLEMS

1. Use the Present Value of an Annuity of \$1 table to find the amount to be invested today to receive a stream of payments for a given number of years in the future. Show the manual check of your answer. (Check may be a few pennies off due to rounding.)

Amount of expected payments	Payment period	Interest rate	Term of annuity	Present value of annuity
a. \$1,500	Yearly	9%	2 years	<u>\$2,638.65</u>
b. \$2,700	Yearly	13%	3 years	<u>\$6,375.24</u>
c. \$2,700	Yearly	6%	3 years	<u>\$7,217.10</u>

2. Find the present value of the following annuities. Use the Present Value of an Annuity of \$1 table.

Amount of each payment	Payment period	Interest rate	Time (years)	Compounded	Present value of annuity
a. \$2,000	Year	7%	25	Annually	<u>\$23,307.20</u>
b. \$7,000	Year	11%	12	Annually	<u>\$45,446.80</u>
c. \$850	6 months	12%	5	Semiannually	<u>\$6,256.09</u>
d. \$1,950	6 months	14%	9	Semiannually	<u>\$19,615.25</u>
e. \$500	Quarter	12%	10	Quarterly	<u>\$11,557.40</u>

WORD PROBLEMS

- Benjamin Afumba would like to receive \$200 each quarter for the 4 years he is in college. If his bank account pays 8% compounded quarterly, how much must he have in his account when he begins college?
\$2,715.54
- Jean Reith has just retired and will receive a \$12,500 retirement check every 6 months for the next 20 years. If her employer can invest money at 12% compounded semiannually, what amount must be invested today to make the semiannual payments to Jean?
\$188,078.75
- Tom Herrick will pay \$4,500 at the end of each year for the next 7 years to pay the balance of his college loans. If Tom can invest his money at 7% compounded annually, how much must he invest today to make the annual payments?
\$24,251.85
- Helen Graham is planning an extended sabbatical for the next 3 years. She would like to invest a lump sum of money at 10% interest so that she can withdraw \$6,000 every 6 months while on sabbatical. What is the amount of the lump sum that Helen must invest?
\$30,454.20
- Linda Rudd has signed a rental contract for office equipment, agreeing to pay \$3,200 at the end of each quarter for the next 5 years. If Linda can invest money at 12% compounded quarterly, find the lump sum she can deposit today to make the payments for the length of the contract.
\$47,608
- Sam Adams is considering lending his brother John \$6,000. John said that he would repay Sam \$775 every 6 months for 4 years. If money can be invested at 8%, calculate the equivalent cash value of the offer today. Should Sam go ahead with the loan?
\$5,217.84 Sam should not take the deal.
- The State Lotto Game offers a grand prize of \$1,000,000 paid in 20 yearly payments of \$50,000. If the state treasurer can invest money at 9% compounded annually, how much must she invest today to make the payments to the grand prize winner?
\$456,425
- Thomas Martin's uncle has promised him upon graduation a gift of \$20,000 in cash or \$2,000 every quarter for the next 3 years. If money can be invested at 8%, which offer will Thomas accept? (Thomas is a business major.)
\$21,150.60 Choose annuity.
- Paul Sasso is selling a piece of land. He has received two solid offers. Farah Bakir has offered a \$60,000 down payment and \$50,000 a year for the next 5 years. Kevin Bassage offered \$35,000 down and \$55,000 a year for the next 5 years. If money can be invested at 7% compounded annually, which offer should Paul accept? (To make the comparison, find the equivalent cash price of each offer.)
Paul should accept Jason's offer. \$265,010
- Abe Hoster decided to retire to Spain in 10 years. What amount should Abe invest today so that he will be able to withdraw \$30,000 at the end of each year for 20 years after he retires? Assume he can invest money at 8% interest compounded annually.
\$136,432.31

Learning Unit 13–3: Sinking Funds (Find Periodic Payments)

DRILL PROBLEMS

1. Given the number of years and the interest rate, use the Sinking Fund Table based on \$1 to calculate the amount of the periodic payment.

Frequency of payment	Length of time	Interest rate	Future amount	Sinking fund payment
a. Annually	19 years	5%	\$125,000	<u>\$4,087.50</u>
b. Annually	7 years	10%	\$205,000	<u>\$21,607.00</u>
c. Semiannually	10 years	6%	\$37,500	<u>\$1,395.00</u>
d. Quarterly	9 years	12%	\$12,750	<u>\$201.45</u>
e. Quarterly	6 years	8%	\$25,600	<u>\$842.24</u>

2. Find the amount of each payment into the sinking fund and the amount of interest earned.

	Maturity value	Interest rate	Term (years)	Frequency of payment	Sinking fund payment	Interest earned
a.	\$45,500	5%	13	Annually	<u>\$2,570.75</u>	<u>\$12,080.25</u>
b.	\$8,500	10%	20	Semiannually	<u>\$70.55</u>	<u>\$5,678.00</u>
c.	\$11,000	8%	5	Quarterly	<u>\$453.20</u>	<u>\$1,936.00</u>
d.	\$66,600	12%	$7\frac{1}{2}$	Semiannually	<u>\$2,863.80</u>	<u>\$23,643.00</u>

WORD PROBLEMS

3. To finance a new police station, the town of Pine Valley issued bonds totaling \$600,000. The town treasurer set up a sinking fund at 8% compounded quarterly in order to redeem the bonds in 7 years. What is the quarterly payment that must be deposited into the fund?
\$16,200 quarterly payment
4. Arlex Oil Corporation plans to build a new garage in 6 years. To finance the project, the financial manager established a \$250,000 sinking fund at 6% compounded semiannually. Find the semiannual payment required for the fund.
\$17,625
5. The City Fisheries Corporation sold \$300,000 worth of bonds that must be redeemed in 9 years. The corporation agreed to set up a sinking fund to accumulate the \$300,000. Find the amount of the periodic payments made into the fund if payments are made annually and the fund earns 8% compounded annually.
\$24,030 annual payments
6. Gregory Mines Corporation wishes to purchase a new piece of equipment in 4 years. The estimated price of the equipment is \$100,000. If the corporation makes periodic payments into a sinking fund with 12% interest compounded quarterly, find the amount of the periodic payments.
\$4,960 quarterly payments
7. The Best Corporation must buy a new piece of machinery in $4\frac{1}{2}$ years that will cost \$350,000. If the firm sets up a sinking fund to finance this new machine, what will the quarterly deposits be assuming the fund earns 8% interest compounded quarterly?
\$16,345 quarterly payments
8. The Lowest-Price-in-Town Company needs \$75,500 in 6 years to pay off a debt. The company makes a decision to set up a sinking fund and make semiannual deposits. What will its payments be if the fund pays 10% interest compounded semiannually?
\$4,741.40 semiannual payments
9. The WIR Company plans to renovate its offices in 5 years. It estimates that the cost will be \$235,000. If the company sets up a sinking fund that pays 12% quarterly, what will its quarterly payments be?
\$8,742 quarterly payments

Learning Unit 14–1: Cost of Installment Buying

DRILL PROBLEMS

1. For the following installment problems, find the amount financed and the finance charge.

	Sale price	Down payment	Number of monthly payments	Monthly payment	Amount financed	Finance charge
a.	\$1,500	\$300	24	\$58	<u>\$1,200</u>	<u>\$192</u>
b.	\$12,000	\$3,000	30	\$340	<u>\$9,000</u>	<u>\$1,200</u>
c.	\$62,500	\$4,700	48	\$1,500	<u>\$57,800</u>	<u>\$14,200</u>
d.	\$4,975	\$620	18	\$272	<u>\$4,355</u>	<u>\$541</u>
e.	\$825	\$82.50	12	\$67.45	<u>\$742.50</u>	<u>\$66.90</u>

2. For each of the above purchases, find the deferred payment price.

	Sale price	Down payment	Number of monthly payments	Monthly payment	Deferred payment price
a.	\$1,500	\$300	24	\$58	<u>\$1,692</u>
b.	\$12,000	\$3,000	30	\$340	<u>\$13,200</u>
c.	\$62,500	\$4,700	48	\$1,500	<u>\$76,700</u>
d.	\$4,975	\$620	18	\$272	<u>\$5,516</u>
e.	\$825	\$82.50	12	\$67.45	<u>\$891.90</u>

3. Use the Annual Percentage Rate Table per \$100 to calculate the estimated APR for each of the previous purchases.

	Sale price	Down payment	Number of monthly payments	Monthly payment	Annual percentage rate
a.	\$1,500	\$300	24	\$58	<u>14.75%</u>
b.	\$12,000	\$3,000	30	\$340	<u>10%</u>
c.	\$62,500	\$4,700	48	\$1,500	<u>11.25%</u>
d.	\$4,975	\$620	18	\$272	<u>15.25%</u>
e.	\$825	\$82.50	12	\$67.45	<u>16.25%</u>

4. Given the following information, calculate the monthly payment by the loan amortization table.

	Amount financed	Interest rate	Number of months of loan	Monthly payment
a.	\$12,000	10%	18	<u>\$720.72</u>
b.	\$18,000	11%	36	<u>\$589.32</u>
c.	\$25,500	13.50%	54	<u>\$632.66</u>

WORD PROBLEMS

5. Jill Walsh purchases a bedroom set for a cash price of \$3,920. The down payment is \$392, and the monthly installment payment is \$176 for 24 months. Find (a) the amount financed, (b) the finance charge, and (c) the deferred payment price.
a. \$3,528 b. \$696 c. \$4,616
6. An automaker promotion loan on a \$20,000 automobile and a down payment of 20% are being financed for 48 months. The monthly payments will be \$367.74. What will be the APR for this auto loan? Use the table in the *Business Math Handbook*.
 $\$367.74 \times 48 = \$17,651.52$
 $\underline{- 16,000.00}$ (Amount financed: $\$20,000 \times .20$ down payment = \$4,000; $\$20,000 - \$4,000 = \$16,000$)
\$ 1,651.52 total finance charge
 $\frac{\$1,651.52 \text{ finance charge}}{\$16,000 \text{ amount financed}} \times 100 = 10.322$ (48 months) = **4.75% to 5.00%**
7. David Nason purchased a recreational vehicle for \$25,000. David went to City Bank to finance the purchase. The bank required that David make a 10% down payment and monthly payments of \$571.50 for 4 years. Find (a) the amount financed, (b) the finance charge, and (c) the deferred payment that David paid.
a. \$22,500 b. \$4,932 c. \$29,932
8. Calculate the estimated APR that David (Problem 7) was charged per \$100 using the Annual Percentage Rate Table.
Approximately 10%
9. Young's Motors advertised a new car for \$16,720. Young's offered an installment plan of 5% down and 42 monthly payments of \$470. What are (a) the deferred payment price and (b) the estimated APR for this car? Use the table.
a. \$20,576 b. 12.75%
10. Angie French bought a used car for \$9,000. Angie put down \$2,000 and financed the balance at 11.50% for 36 months. What is her monthly payment? Use the loan amortization table.
\$230.86

Learning Unit 14-2: Revolving Charge Credit Cards

DRILL PROBLEMS

1. Use the U.S. Rule to calculate the outstanding balance due for each of the following independent situations:

Monthly payment number	Outstanding balance due	1½% interest payment	Amount of monthly payment	Reduction in balance due	Outstanding balance due
a. 1	\$9,000.00	<u>\$135</u>	\$600	<u>\$465</u>	<u>\$8,535</u>
b. 5	\$5,625.00	<u>\$84.38</u>	\$1,000	<u>\$915.62</u>	<u>\$4,709.38</u>
c. 4	\$926.50	<u>\$13.90</u>	\$250	<u>\$236.10</u>	<u>\$690.40</u>
d. 12	\$62,391.28	<u>\$935.87</u>	\$1,200	<u>\$264.13</u>	<u>\$62,127.15</u>
e. 8	\$3,255.19	<u>\$48.83</u>	\$325	<u>\$276.17</u>	<u>\$2,979.02</u>

2. Complete the missing data for a \$6,500 purchase made on credit. The annual interest charge on this revolving charge account is 18%, or $1\frac{1}{2}\%$ interest on previous month's balance. Use the U.S. Rule.

Monthly payment number	Outstanding balance due	$1\frac{1}{2}\%$ interest payment	Amount of monthly payment	Reduction in balance due	Outstanding balance due
1	\$6,500	<u>\$97.50</u>	\$700	<u>\$602.50</u>	<u>\$5,897.50</u>
2	<u>\$5,897.50</u>	<u>\$88.46</u>	\$700	<u>\$611.54</u>	<u>\$5,285.96</u>
3	<u>\$5,285.96</u>	<u>\$79.29</u>	\$700	<u>\$620.71</u>	<u>\$4,665.25</u>

3. Calculate the average billing daily balance for each of the monthly statements for the following revolving credit accounts; assume a 30-day billing cycle:

Billing date	Previous balance	Payment date	Payment amount	Charge date(s)	Charge amount(s)	Average daily balance
a. 4/10	\$329	4/25	\$35	4/29	\$56	<u>\$332.03</u>
b. 6/15	\$573	6/25	\$60	6/26	\$25	
				6/30	\$72	<u>\$584.83</u>
c. 9/15	\$335.50	9/20	\$33.55	9/25	\$12.50	
				9/26	\$108	<u>\$384.28</u>

4. Find the finance charge for each monthly statement (Problem 3) if the annual percentage rate is 15%.

a. \$4.15 b. \$7.31 c. \$4.80

WORD PROBLEMS

5. Niki Marshall is going to buy a new bedroom set at Scottie's Furniture Store, where she has a revolving charge account. The cost of the bedroom set is \$5,500. Niki does not plan to charge anything else to her account until she has completely paid for the bedroom set. Scottie's Furniture Store charges an annual percentage rate of 18%, or $1\frac{1}{2}\%$ per month. Niki plans to pay \$1,000 per month until she has paid for the bedroom set. Set up a schedule for Niki to show her outstanding balance at the end of each month after her \$1,000 payment and also the amount of her final payment. Use the U.S. Rule.

\$784.39

6. Frances Dollof received her monthly statement from Brown's Department Store. The following is part of the information contained on that statement. Finance charge is calculated on the average daily balance.

Date	Reference	Department	Description	Amount
Dec. 15	5921	359	Petite sportswear	84.98
Dec. 15	9612	432	Footwear	55.99
Dec. 15	2600	126	Women's fragrance	35.18
Dec. 23	6247	61	Ralph Lauren towels	20.99
Dec. 24	0129	998	Payment received—thank you	100.00CR
Previous balance		Annual percentage rate		Billing date
	719.04	12/13	18%	JAN 13
Brown's Charge Account Terms				
Payment is required in monthly installments upon receipt of monthly statement in accordance with Brown's payment terms.				
When my new balance is:	My minimum required payment is:	When my new balance is:	My minimum required payment is:	
Up to \$20.00	New Balance	\$350.01 to \$400.00	\$40.00	
\$ 20.01 to \$200.00	\$20.00	\$400.01 to \$450.00	\$45.00	
\$200.01 to \$250.00	\$25.00	\$450.01 to \$500.00	\$50.00	
\$250.01 to \$300.00	\$30.00	More than \$500.00	\$50.00 plus	
\$300.01 to \$350.00	\$35.00		\$10.00 for each \$50.00	
			(or fraction thereof)	
			of New Balance over	
			\$500.00	

- a. Calculate the average daily balance for the month. \$833.53
- b. What is Ms. Dollof's finance charge? \$12.50
- c. What is the new balance for Ms. Dollof's account? \$828.68
- d. What is the minimum payment Frances is required to pay according to Brown's payment terms? \$120

7. What is the finance charge for a Brown's customer who has an average daily balance of \$3,422.67? **\$51.34**
8. What is the minimum payment for a Brown's customer with a new balance of \$522.00? **\$60**
9. What is the minimum payment for a Brown's customer with a new balance of \$325.01? **\$35**
10. What is the new balance for a Brown's customer with a previous balance of \$309.35 whose purchases totaled \$213.00, given that the customer made a payment of \$75.00 and the finance charge was \$4.65? **\$452.00**

RECAP OF WORD PROBLEMS IN LU 14-1

11. A home equity loan on a \$20,000 automobile with a down payment of 20% is being financed for 48 months. The interest is tax deductible. The monthly payments will be \$401.97. What is the APR on this loan? Use the table in the *Business Math Handbook*. If the person is in the 28% income tax bracket, what will be the tax savings with this type of a loan?

$$\begin{array}{r}
 \$401.97 \times 48 = \$19,294.56 \text{ total all monthly payments} \\
 - 16,000.00 \text{ amount financed} \\
 \hline
 \$ 3,294.56 \text{ total finance charge} \\
 \\
 \frac{\$3,294.56 \text{ finance charge}}{\$16,000.00 \text{ amount charged}} \times 100 = 20.591 (48 \text{ months}) = 9.50\% \text{ to } 9.75\% \\
 \\
 \frac{\$3,294.56}{\times .28 \text{ tax bracket}} \\
 \hline
 \$ 922.48 \text{ deductible tax savings}
 \end{array}$$

12. An automobile with a total transaction price of \$20,000 with a down payment of 20% is being financed for 48 months. Banks and credit unions require a monthly payment of \$400.36. What is the APR for this auto loan? Use the table in the *Business Math Handbook*.

$$\begin{array}{r}
 \$400.36 \times 48 = \$19,217.28 \\
 - 16,000.00 \text{ amount financed} \\
 \hline
 \$ 3,217.28 \text{ total finance charge}
 \end{array}$$

$$\frac{\$3,217.28 \text{ finance charge}}{\$16,000.00 \text{ amount financed}} \times 100 = 20.108 (48 \text{ months}) = 9.25\% \text{ to } 9.50\%$$

13. Assume you received a \$2,000 rebate that brought the price of a car down to \$20,000; the financing rate was for 48 months, and your total interest was \$3,279. Using the table in the *Business Math Handbook*, what was your APR?

$$\frac{\$3,279 \text{ finance charge}}{\$20,000 \text{ amount financed}} \times 100 = 16.395 (48 \text{ months}) = 7.50\% \text{ to } 7.75\%$$

Learning Unit 15-1: Types of Mortgages and the Monthly Mortgage Payment

DRILL PROBLEMS

1. Use the table in the *Business Math Handbook* to calculate the monthly payment for principal and interest for the following mortgages:

Price of home	Down payment	Interest rate	Term in years	Monthly payment
a. \$200,000	15%	6%	25	<u>\$1,095.31</u> (170 × \$6.44301)
b. \$200,000	15%	5 $\frac{1}{2}$ %	30	<u>\$965.24</u> (170 × 5.67789)
c. \$450,000	10%	4 $\frac{3}{4}$ %	15	<u>\$3,150.22</u> (405 × 7.77832)
d. \$450,000	10%	7%	30	<u>\$2,694.47</u> (405 × 6.65302)

2. For each of the mortgages, calculate the amount of interest that will be paid over the life of the loan.

Price of home	Down payment	Interest rate	Term in years	Total interest paid
a. \$200,000	15%	6 $\frac{1}{2}$ %	25	<u>\$158,593</u> (300 × \$1,095.31 = \$328,593) - 170,000 \$158,593
b. \$200,000	15%	5 $\frac{1}{2}$ %	30	<u>\$177,486.40</u>
c. \$450,000	10%	4 $\frac{3}{4}$ %	15	<u>\$162,039.60</u>
d. \$450,000	10%	7%	30	<u>\$565,009.20</u>

3. Calculate the increase in the monthly mortgage payments for each of the rate increases in the following mortgages. Then calculate what percent of change the increase represents, rounded to the nearest tenth percent.

Mortgage amount	Term in years	Interest rate	Increase in interest rate	Increase in monthly payment	Percent change
a. \$175,000	15	5%	1%	<u>\$92.86</u>	<u>6.7%</u>
b. \$300,000	30	$6\frac{3}{4}\%$	$\frac{3}{4}\%$	<u>\$151.86</u>	<u>7.8%</u>

4. Calculate the increase in total interest paid for the increase in interest rates in Problem 3.

Mortgage amount	Term in years	Interest rate	Increase in interest rate	Increase in total interest paid
a. \$175,000	15	5%	1%	<u>\$16,714.80</u>
b. \$300,000	30	$6\frac{3}{4}\%$	$\frac{3}{4}\%$	<u>\$54,669.60</u>

WORD PROBLEMS

- The Buckles are planning to purchase a new home that costs \$150,000. The bank is charging them 6% interest and requires a 20% down payment. The Buckles are planning to take a 25-year mortgage. How much will their monthly payment be for principal and interest?
\$773.16 ($120 \times \6.44301)
- The MacEacherns wish to buy a new house that costs \$299,000. The bank requires a 15% down payment and charges $5\frac{1}{2}\%$ interest. If the MacEacherns take out a 15-year mortgage, what will their monthly payment for principal and interest be?
\$2,076.62
- Because the monthly payments are so high, the MacEacherns (Problem 6) want to know what the monthly payments would be for (a) a 25-year mortgage and (b) a 30-year mortgage. Calculate these two payments.
a. \$1,560.70 b. \$1,443.04
- If the MacEacherns choose a 30-year mortgage instead of a 15-year mortgage, (a) how much money will they “save” monthly and (b) how much more interest will they pay over the life of the loan?
a. \$633.58 b. \$145,702.80
- If the MacEacherns choose the 25-year mortgage instead of the 30-year mortgage, (a) how much more will they pay monthly and (b) how much less interest will they pay over the life of the loan?
a. \$117.68 b. \$51,284.40
- Larry and Doris Davis plan to purchase a new home that costs \$415,000. The bank that they are dealing with requires a 20% down payment and charges $5\frac{3}{4}\%$. The Davises are planning to take a 25-year mortgage. What will the monthly payment be?
\$2,088.63
- How much interest will the Davises (Problem 10) pay over the life of the loan?
\$294,589

Learning Unit 15–2: Amortization Schedule—Breaking Down the Monthly Payment

DRILL PROBLEMS

1. In the following, calculate the monthly payment for each mortgage, the portion of the first monthly payment that goes to interest, and the portion of the payment that goes toward the principal.

Amount of mortgage	Interest rate	Term in years	Monthly payment	Portion to interest	Portion to principal
a. \$170,000	$3\frac{5}{8}\%$	10	<u>\$1,691.03</u>	<u>\$513.54</u>	<u>\$1,177.49</u>
b. \$222,000	$4\frac{3}{4}\%$	30	<u>\$1,158.06</u>	<u>\$878.75</u>	<u>\$279.31</u>
c. \$167,000	$6\frac{1}{2}\%$	25	<u>\$1,127.60</u>	<u>\$904.58</u>	<u>\$223.20</u>
d. \$307,000	$4\frac{1}{4}\%$	15	<u>\$2,309.29</u>	<u>\$1,087.29</u>	<u>\$1,222.20</u>
e. \$409,500	$5\frac{1}{2}\%$	20	<u>\$2,816.90</u>	<u>\$1,876.88</u>	<u>\$940.03</u>

2. Prepare an amortization schedule for the first 3 months of a 25-year, 6% mortgage on \$265,000.

Payment number	Monthly payment	Portion to interest	Portion to principal	Balance of loan outstanding
1	<u>\$1,707.40</u>	<u>\$1,325.00</u>	<u>\$382.40</u>	<u>\$264,617.60</u>
2	<u>\$1,707.40</u>	<u>\$1,323.09</u>	<u>\$384.31</u>	<u>\$264,233.29</u>
3	<u>\$1,707.40</u>	<u>\$1,321.17</u>	<u>\$386.23</u>	<u>\$263,847.06</u>

3. Prepare an amortization schedule for the first 4 months of a 10-year, $3\frac{7}{8}\%$ mortgage on \$195,500.

Payment number	Monthly payment	Portion to interest	Portion to principal	Balance of loan outstanding
1	<u>\$1,967.75</u>	<u>\$631.30</u>	<u>\$1,336.45</u>	<u>\$194,163.55</u>
2	<u>\$1,967.75</u>	<u>\$626.99</u>	<u>\$1,340.76</u>	<u>\$192,822.79</u>
3	<u>\$1,967.75</u>	<u>\$622.66</u>	<u>\$1,345.09</u>	<u>\$191,477.70</u>
4	<u>\$1,967.75</u>	<u>\$618.31</u>	<u>\$1,349.44</u>	<u>\$190,128.26</u>

WORD PROBLEMS

4. Jim and Janice Hurst are buying a new home for \$235,000. The bank that is financing the home requires a 20% down payment and charges a $5\frac{1}{8}\%$ interest rate. Janice wants to know (a) what the monthly payment for the principal and interest will be if they take out a 20-year mortgage and (b) how much of the first payment will be for interest on the loan.

a. \$1,253.74

b. \$802.92

5. The Hursts (Problem 4) thought that a lot of their money was going to interest. They asked the banker just how much they would be paying for interest over the life of the loan. Calculate the total amount of interest that the Hursts will pay. **\$112,897.60**
6. The banker told the Hursts (Problem 4) that they could, of course, save on the interest payments if they took out a loan for a shorter period of time. Jim and Janice decided to see if they could afford a 15-year mortgage. Calculate how much more the Hursts would have to pay each month for principal and interest if they took a 15-year mortgage for their loan. **\$245.22**
7. The Hursts (Problem 4) thought that they might be able to afford the 15-year mortgage (Problem 6), but first they wanted to see (a) how much of the first payment would go to the principal and (b) how much total interest they would be paying with a 15-year mortgage.

a. \$696.04 principal payment

b. \$81,812.80

- 8.
- | | 1980 | 2022 |
|--------------------------------------|----------|------------------|
| Cost of median-priced new home | \$44,200 | \$295,300 |
| 10% down payment | \$4,420 | |
| Fixed-rate, 30-year mortgage | | |
| Interest rate | 8.9% | $6\frac{1}{8}\%$ |
| Total monthly principal and interest | \$316 | |

Complete the 2022 year.

\$295,300

× .10

\$ 29,530 down payment

$\frac{\$265,770}{\$1,000} = \$265.77$ $\$265.77 \times \$6.07611 = \$1,614.85$

9. You can't count on your home mortgage lender to keep you from getting in debt over your head. The old standards of allowing 28% of your income for mortgage debt (including taxes and insurance) usually still apply. If your total monthly payment is \$1,033, what should be your annual income to buy a home?

$\$1,033 \times 12 = \$12,396$ $\frac{\$12,396}{.28} = \$44,271.43$ annual income

\$12,396 per year

10. Assume that a 30-year fixed-rate mortgage for \$100,000 was 8% at one date as opposed to 7% the previous year. What is the difference in monthly payments for these 2 years?

$\frac{\$100,000}{\$1,000} = 100 \times \$7.33765 = \733.77 monthly payment $\frac{\$100,000}{\$1,000} = 100 \times \$6.65302 = \665.30 monthly payment

$\$733.77 - \$665.30 = \$68.47$ per month

11. If you had a \$100,000 mortgage with 7½% interest for 25 years and wanted a 7½% loan for 30 years, what would be the change in monthly payments? How much more would you pay in interest?

$$\frac{\$100,000}{\$1,000} = 100 \times \$7.38991 = \$738.99 \text{ monthly payment} \quad \frac{\$100,000}{\$1,000} = 100 \times \$6.99215 = \$699.22 \text{ monthly payment}$$

$$\$738.99 - \$699.22 = \$39.77 \text{ less per month}$$

$$\$738.99 \times 300 = \$221,697 \quad \$699.22 \times 360 = \$251,719.20 \quad \$251,719.20 - \$221,697.00 = \$30,022.20 \text{ more interest}$$

Learning Unit 16–1: Balance Sheet—Report as of a Particular Date

DRILL PROBLEMS

1. Complete the balance sheet for David Harrison, Attorney, on December 31, 20XX, and show that

$$\text{Assets} = \text{Liabilities} + \text{Owner's equity}$$

Account totals are as follows: accounts receivable, \$4,800; office supplies, \$375; building (net), \$130,000; accounts payable, \$1,200; notes payable, \$137,200; cash, \$2,250; prepaid insurance, \$1,050; office equipment (net), \$11,250; land, \$75,000; capital, \$85,900; and salaries payable, \$425.

DAVID HARRISON, ATTORNEY Balance Sheet December 31, 20XX			
Assets			
Current assets:			
Cash	\$ 2,250		
Accounts receivable	4,800		
Prepaid insurance	1,050		
Office supplies	375		
Total current assets		\$ 8,475	
Plant and equipment:			
Office equipment (net)	\$ 11,250		
Building (net)	130,000		
Land	75,000		
Total plant and equipment		216,250	
Total assets			\$224,725
Liabilities			
Current liabilities:			
Accounts payable	\$ 1,200		
Salaries payable	425		
Total current liabilities		\$ 1,625	
Long-term liabilities:			
Notes payable		137,200	
Total liabilities			\$138,825
Owner's Equity			
David Harrison, capital, December 31, 20XX			85,900
Total liabilities and owner's equity			\$224,725

2. Given the amounts in each of the accounts of Fisher-George Electric Corporation, fill in these amounts on the balance sheet for December 31, 20XX, to show that

$$\text{Assets} = \text{Liabilities} + \text{Stockholders' equity}$$

Account totals are as follows: cash, \$2,500; merchandise inventory, \$1,325; automobiles (net), \$9,250; common stock, \$10,000; accounts payable, \$275; office equipment (net), \$5,065; accounts receivable, \$300; retained earnings, \$6,895; prepaid insurance, \$1,075; salaries payable, \$175; and mortgage payable, \$2,170.

FISHER-GEORGE ELECTRIC CORPORATION				
Balance Sheet				
December 31, 20XX				
Assets				
Current assets:				
Cash		\$2,500		
Accounts receivable		300		
Merchandise inventory		1,325		
Prepaid insurance		1,075		
Total current assets			\$ 5,200	
Plant and equipment:				
Office equipment (net)		\$5,065		
Automobiles (net)		9,250		
Total plant and equipment			14,315	
Total assets				\$19,515
Liabilities				
Current liabilities:				
Accounts payable		\$ 275		
Salaries payable		175		
Total current liabilities			\$ 450	
Long-term liabilities:				
Mortgage payable			2,170	
Total liabilities				\$ 2,620
Stockholders' Equity				
Common stock		\$10,000		
Retained earnings		6,895		
Total stockholders' equity				19,895
Total liabilities and stockholders' equity				\$19,515

3. Complete a vertical analysis of the following partial balance sheet; round all percents to the nearest hundredth percent.

THREEMAX INC.				
Comparative Balance Sheet Vertical Analysis				
At December 31, 2025 and 2026				
	2026		2025	
	Amount	Percent	Amount	Percent
Assets				
Cash	\$ 8,500	2.13%	\$ 10,200	2.84%
Accounts receivable (net)	11,750	2.95	15,300	4.26
Merchandise inventory	55,430	13.90	54,370	15.12
Store supplies	700	0.18	532	0.15
Office supplies	650	0.16	640	0.18
Prepaid insurance	2,450	0.61	2,675	0.74
Office equipment (net)	12,000	3.01	14,300	3.98
Store equipment (net)	32,000	8.02	31,000	8.62
Building (net)	75,400	18.90	80,500	22.39
Land	200,000	50.14	150,000	41.72
Total assets	\$398,880	100.00%	\$359,517	100.00%

4. Complete a horizontal analysis of the following partial balance sheet; round all percents to the nearest hundredth percent.

THREEMAX INC. Comparative Balance Sheet Horizontal Analysis At December 31, 2025 and 2026				
	2026	2025	Change	Percent
Assets				
Cash	\$ 8,500	\$ 10,200	<u>\$-1,700</u>	<u>-16.67%</u>
Accounts receivable (net)	11,750	15,300	<u>-3,550</u>	<u>-23.20</u>
Merchandise inventory	55,430	54,370	<u>1,060</u>	<u>1.95</u>
Store supplies	700	532	<u>168</u>	<u>31.58</u>
Office supplies	650	640	<u>10</u>	<u>1.56</u>
Prepaid insurance	2,450	2,675	<u>-225</u>	<u>-8.41</u>
Office equipment (net)	12,000	14,300	<u>-2,300</u>	<u>-16.08</u>
Store equipment (net)	32,000	31,000	<u>1,000</u>	<u>3.23</u>
Building (net)	75,400	80,500	<u>-5,100</u>	<u>-6.34</u>
Land	200,000	150,000	<u>50,000</u>	<u>33.33</u>
Total assets	<u>\$398,880</u>	<u>\$359,517</u>		

Learning Unit 16–2: Income Statement—Report for a Specific Period of Time

DRILL PROBLEMS

1. Complete the income statement for the year ended December 31, 20XX, for Foley Realty, doing all the necessary addition. Account totals are as follows: office salaries expense, \$15,255; advertising expense, \$2,400; rent expense, \$18,000; telephone expense, \$650; insurance expense, \$1,550; office supplies, \$980; depreciation expense, office equipment, \$990; depreciation expense, automobile, \$2,100; sales commissions earned, \$98,400; and management fees earned, \$1,260.

FOLEY REALTY Income Statement For the Year Ended December 31, 20XX		
Revenues:		
Sales commissions earned	<u>\$98,400</u>	
Management fees earned	<u>1,260</u>	
Total revenues		<u>\$99,660</u>
Operating expenses:		
Office salaries expense	<u>\$15,225</u>	
Advertising expense	<u>2,400</u>	
Rent expense	<u>18,000</u>	
Telephone expense	<u>650</u>	
Insurance expense	<u>1,550</u>	
Office supplies expense	<u>980</u>	
Depreciation expense, office equipment	<u>990</u>	
Depreciation expense, automobile	<u>2,100</u>	
Total operating expenses		<u>41,895</u>
Net income		<u>\$57,765</u>

2. Complete the income statement for Toll's Inc., a merchandising concern, doing all the necessary addition and subtraction. Sales were \$250,000; sales returns and allowances were \$1,400; sales discounts were \$2,100; merchandise inventory, December 31, 2025, was \$42,000; purchases were \$156,000; purchases returns and allowances were \$1,100; purchases discounts were \$3,000; merchandise inventory, December 31, 2026, was \$47,000; selling expenses were \$37,000; and general and administrative expenses were \$29,000.

TOLL'S INC. Income Statement For the Year Ended December 31, 2026				
Revenues:				
Sales				\$250,000
Less: Sales return and allowances		\$ 1,400		
Sales discounts		2,100	3,500	
Net sales				\$246,500
Cost of goods sold:				
Merchandise inventory, December 31, 2025		\$ 42,000		
Purchases		\$156,000		
Less: Purchases returns and allowances	\$1,100			
Purchase discounts	3,000	4,100		
Cost of net purchases			151,900	
Goods available for sale			\$193,900	
Merchandise inventory, December 31, 2026			47,000	
Total cost of goods sold				146,900
Gross profit from sales				\$ 99,600
Operating expenses:				
Selling expenses		\$ 37,000		
General and administrative expenses		29,000		
Total operating expenses				66,000
Net income				\$ 33,600

3. Complete a vertical analysis of the following partial income statement; round all percents to the nearest hundredth percent. Note net sales are 100%.

THREEMAX INC. Comparative Income Statement Vertical Analysis For Years Ended December 31, 2025 and 2026				
	2026		2025	
	Amount	Percent	Amount	Percent
Sales	\$795,450	101.63%	\$665,532	101.60%
Sales returns and allowances	−6,250	−0.80	−5,340	−0.82
Sales discounts	−6,470	−0.83	−5,125	−0.78
Net sales	\$782,730	100.00	\$655,067	100.00
Cost of goods sold:				
Beginning inventory	\$ 75,394	9.63	\$ 81,083	12.38
Purchases	575,980	73.59	467,920	71.43
Purchase discounts	−4,976	−0.64	−2,290	−0.35
Goods available for sale	\$646,398	82.58	\$546,713	83.46
Less ending inventory	−66,254	−8.46	− 65,712	−10.03
Total costs of goods sold	\$580,144	74.12	\$481,001	73.43
Gross profit	\$202,586	25.88	\$174,066	26.57

4. Complete a horizontal analysis of the following partial income statement. Round all percents to the nearest hundredth percent.

THREEMAX INC. Comparative Income Statement Horizontal Analysis For Years Ended December 31, 2025 and 2026				
	2026	2025	Change	Percent
Sales	\$795,450	\$665,532	129,918	19.52%
Sales returns and allowances	–6,250	– 5,340	–910	17.04
Sales discounts	–6,470	– 5,125	–1,345	26.24
Net sales	\$782,730	\$655,067	127,663	19.49
Cost of goods sold:				
Beginning inventory	\$ 75,394	\$ 81,083	–5,689	–7.02
Purchases	575,980	467,920	108,060	23.09
Purchase discounts	–4,976	–2,290	–2,686	117.29
Goods available for sale	\$646,398	\$546,713	99,685	18.23
Less ending inventory	–66,254	– 65,712	–542	0.82
Total cost of goods sold	\$580,144	\$481,001	99,143	20.61
Gross profit	\$202,586	\$ 174,066	28,520	16.38

Learning Unit 16–3: Trend and Ratio Analysis

DRILL PROBLEMS

1. Express each amount as a percent of the base-year (2020) amount. Round to the nearest tenth percent.

	2026	2025	2024	2023
Sales	\$562,791	\$560,776	\$588,096	\$601,982
Percent	93.5%	93.2%	97.7%	100.0%
Gross profit	\$168,837	\$196,271	\$235,238	\$270,891
Percent	62.3%	72.5%	86.8%	100.0%
Net income	\$67,934	\$65,927	\$56,737	\$62,762
Percent	108.2%	105.0%	90.4%	100.0%

- If current assets = \$42,500 and current liabilities = \$56,400, what is the current ratio (to the nearest hundredth)?
0.75
- In Problem 2, if inventory = \$20,500 and prepaid expenses = \$9,750, what is the quick ratio, or acid test (to the nearest hundredth)?
0.22
- If accounts receivable = \$36,720 and net sales = \$249,700, what is the average day's collection (to the nearest whole day)?
53 days
- If total liabilities = \$243,000 and total assets = \$409,870, what is the ratio of total debt to total assets (to the nearest hundredth percent)?
59.29%
- If net income = \$55,970 and total stockholders' equity = \$440,780, what is the return on equity (to the nearest hundredth percent)?
12.70%
- If net sales = \$900,000 and total assets = \$1,090,000, what is the asset turnover (to the nearest hundredth)?
.83
- In Problem 7, if the net income is \$36,600, what is the profit margin on net sales (to the nearest hundredth percent)?
4.07%

2. Find the annual depreciation using the straight-line depreciation method. Round to the nearest whole dollar.

Cost of asset	Residual value	Useful life	Annual depreciation
a. \$2,460	\$400	4 years	<u>\$515</u>
b. \$24,300	\$2,000	6 years	<u>\$3,717</u>
c. \$350,000	\$42,500	12 years	<u>\$25,625</u>
d. \$17,325	\$5,000	5 years	<u>\$2,465</u>
e. \$2,550,000	\$75,000	30 years	<u>\$82,500</u>

3. Find the annual depreciation and ending book value for the first year using the straight-line depreciation method. Round to the nearest dollar.

Cost	Residual value	Useful life	Annual depreciation	Ending book value
a. \$6,700	\$600	3 years	<u>\$2,033</u>	<u>\$4,667</u>
b. \$11,600	\$500	6 years	<u>\$1,850</u>	<u>\$9,750</u>
c. \$9,980	—0—	5 years	<u>\$1,996</u>	<u>\$7,984</u>
d. \$36,950	\$2,500	12 years	<u>\$2,871</u>	<u>\$34,079</u>
e. \$101,690	\$3,600	27 years	<u>\$3,633</u>	<u>\$98,057</u>

4. Find the first-year depreciation to the nearest dollar for the following assets, which were only owned for part of a year. Round to the nearest whole dollar the annual depreciation for in-between calculations.

Date of purchase	Cost of asset	Residual value	Useful life	First year depreciation
a. April 8	\$10,500	\$1,200	4 years	<u>\$1,744</u>
b. July 12	\$23,900	\$3,200	6 years	<u>\$1,725</u>
c. June 19	\$8,880	\$800	3 years	<u>\$1,347</u>
d. November 2	\$125,675	\$6,000	17 years	<u>\$1,173</u>
e. May 25	\$44,050	—0—	9 years	<u>\$2,855</u>

WORD PROBLEMS

- North Shore Grinding purchased a lathe for \$37,500. This machine has a residual value of \$3,000 and an expected useful life of 4 years. Prepare a depreciation schedule for the lathe using the straight-line depreciation method.
\$8,625 annual depreciation
- Colby Wayne paid \$7,750 for a photocopy machine with an estimated life of 6 years and a residual value of \$900. Prepare a depreciation schedule using the straight-line depreciation method. Round to the nearest whole dollar. (Last year's depreciation may have to be adjusted due to rounding.)
\$1,142 annual depreciation
- The Leo Brothers purchased a machine for \$8,400 that has an estimated life of 3 years. At the end of 3 years the machine will have no value. Prepare a depreciation schedule using the straight-line depreciation method for this machine.
\$2,800 annual depreciation
- Fox Realty bought a computer table for \$1,700. The estimated useful life of the table is 7 years. The residual value at the end of 7 years is \$370. Find (a) the annual rate of depreciation to the nearest hundredth percent, (b) the annual amount of depreciation, and (c) the book value of the table at the end of the *third* year using the straight-line depreciation method.
a. 14.29% b. \$190 c. \$1,130
- Cashman Inc. purchased an overhead projector for \$560. It has an estimated useful life of 6 years, at which time it will have no remaining value. Find the book value at the end of 5 years using the straight-line depreciation method. Round the annual depreciation to the nearest whole dollar.
\$95
- Shelley Corporation purchased a new machine for \$15,000. The estimated life of the machine is 12 years with a residual value of \$2,400. Find (a) the annual rate of depreciation by the straight-line method to the nearest hundredth percent, (b) the annual amount of depreciation, (c) the accumulated depreciation at the end of 7 years, and (d) the book value at the end of 9 years.
a. 8.33% b. \$1,050 c. \$7,350 d. \$5,550
- Wolfe Ltd. purchased a supercomputer for \$75,000 on July 7, 2021. The computer has an estimated life of 5 years and will have a residual value of \$15,000. Find (a) the annual depreciation amount by the straight-line method, (b) the depreciation amount for 2021, (c) the accumulated depreciation at the end of 2022, and (d) the book value at the end of 2023.
a. \$12,000 b. \$6,000 c. \$18,000 d. \$45,000

Learning Unit 17–2: Units-of-Production Method

DRILL PROBLEMS

1. Find the depreciation per unit for each of the following assets. Round to three decimal places.

	Cost of asset	Residual value	Estimated production	Depreciation per unit
a.	\$3,500	\$800	9,000 units	<u>\$0.300</u>
b.	\$309,560	\$22,000	1,500,000 units	<u>\$0.192</u>
c.	\$54,890	\$6,500	275,000 units	<u>\$0.176</u>

2. Find the annual depreciation expense for each of the assets in Problem 1.

	Cost of asset	Residual value	Estimated production	Depreciation per unit	Units produced	Amount of depreciation
a.	\$3,500	\$800	9,000 units	<u>\$0.300</u>	3,000	<u>\$900</u>
b.	\$309,560	\$22,000	1,500,000 units	<u>\$0.192</u>	45,500	<u>\$8,736</u>
c.	\$54,890	\$6,500	275,000 units	<u>\$0.176</u>	4,788	<u>\$842.69</u>

3. Find the book value at the end of the first year for each of the assets in Problems 1 and 2.

	Cost of asset	Residual value	Estimated production	Depreciation per unit	Units produced	Book value
a.	\$3,500	\$800	9,000 units	<u>\$0.300</u>	3,000	<u>\$2,600</u>
b.	\$309,560	\$22,000	1,500,000 units	<u>\$0.192</u>	45,500	<u>\$300,824</u>
c.	\$54,890	\$6,500	275,000 units	<u>\$0.176</u>	4,788	<u>\$54,047.31</u>

4. Calculate the accumulated depreciation at the end of year 2 for each of the following machines. Carry out the unit depreciation to three decimal places.

	Cost of machine	Residual value	Estimated life	Hours used during year 1	Hours used during year 2	Accumulated depreciation
a.	\$67,900	\$4,300	19,000 hours	5,430	4,856	<u>\$34,427.24</u>
b.	\$3,810	\$600	33,000 hours	10,500	9,330	<u>\$1,923.51</u>
c.	\$25,000	\$4,900	80,000 hours	7,000	12,600	<u>\$4,919.60</u>

WORD PROBLEMS

5. Prepare a depreciation schedule for the following machine: The machine cost \$63,400; it has an estimated residual value of \$5,300 and expected life of 290,500 units. The units produced were:

Year 1	95,000 units	
Year 2	80,000 units	
Year 3	50,000 units	\$5,300 book value at the end of year 5
Year 4	35,500 units	
Year 5	30,000 units	

6. Forsmann & Smythe purchased a new machine that cost \$46,030. The machine has a residual value of \$2,200 and estimated output of 430,000 hours. Prepare a units-of-production depreciation schedule for this machine, rounding the unit depreciation to three decimal places. The hours of use were:

Year 1	90,000 hours	
Year 2	150,000 hours	
Year 3	105,000 hours	\$2,200 book value at the end of year 4
Year 4	90,000 hours	

7. Young Electrical Company depreciates its vans using the units-of-production method. The cost of its new van was \$24,600, the useful life is 125,000 miles, and the trade-in value is \$5,250. What are (a) the depreciation expense per mile (to three decimal places) and (b) the book value at the end of the first year if it is driven 29,667 miles?

a. \$0.155 b. \$20,001.61

8. Tremblay Manufacturing Company purchased a new machine for \$52,000. The machine has an estimated useful life of 185,000 hours and a residual value of \$10,000. The machine was used for 51,200 hours the first year. Find (a) the depreciation rate per hour, rounded to three decimal places, (b) the depreciation expense for the first year, and (c) the book value of the machine at the end of the first year.

a. \$0.227 b. \$11,622.40 c. \$40,377.60

Learning Unit 17–3: Declining-Balance Method**DRILL PROBLEMS**

1. Find the declining-balance rate of depreciation, given the following estimated lives.

Life	Declining rate
a. 25 years	$8\% \left(\frac{1}{25} \times 2 = \frac{2}{25} \right)$
b. 10 years	$20\% \left(\frac{1}{10} \times 2 = \frac{2}{10} \right)$
c. 8 years	$25\% \left(\frac{1}{8} \times 2 = \frac{2}{8} \right)$

2. Find the first year depreciation amount for the following assets using the declining-balance depreciation method. Round to the nearest whole dollar.

Cost of asset	Residual value	Useful life	First year depreciation
a. \$2,460	\$400	4 years	<u>\$1,230</u>
b. \$24,300	\$2,000	6 years	<u>\$8,100</u>
c. \$350,000	\$42,500	12 years	<u>\$58,333</u>
d. \$17,325	\$5,000	5 years	<u>\$6,930</u>
e. \$2,550,000	\$75,000	30 years	<u>\$170,000</u>

3. Find the depreciation expense and ending book value for the first year, using the declining-balance depreciation method. Round to the nearest dollar.

Cost	Residual value	Useful life	First year depreciation	Ending book value
a. \$6,700	\$600	3 years	<u>\$4,467</u>	<u>\$2,233</u>
b. \$11,600	\$500	6 years	<u>\$3,867</u>	<u>\$7,733</u>
c. \$9,980	—0—	5 years	<u>\$3,992</u>	<u>\$5,988</u>
d. \$36,950	\$2,500	12 years	<u>\$6,158</u>	<u>\$30,792</u>
e. \$101,690	\$3,600	27 years	<u>\$7,533</u>	<u>\$94,157</u>

WORD PROBLEMS

4. North Shore Grinding purchased a lathe for \$37,500. This machine has a residual value of \$3,000 and an expected useful life of 4 years. Prepare a depreciation schedule for the lathe using the declining-balance depreciation method. Round to the nearest whole dollar.
Depreciation in year 4 is \$1,687
5. Colby Wayne paid \$7,750 for a photocopy machine with an estimated life of 6 years and a residual value of \$900. Prepare a depreciation schedule using the declining-balance depreciation method. Round to the nearest whole dollar.
Depreciation in year 6 is \$121
6. The Leo Company purchased a machine for \$8,400 that has an estimated life of 3 years. At the end of 3 years, the machine will have no value. Prepare a depreciation schedule for this machine using the declining-balance depreciation method. Round to the nearest whole dollar.
Depreciation in year 3 is \$933
7. Fox Realty bought a computer table for \$1,700. The estimated useful life of the table is 7 years. The residual value at the end of 7 years is \$370. Find (a) the declining depreciation rate to the nearest hundredth percent, (b) the amount of depreciation at the end of the *third* year, and (c) the book value of the table at the end of the *third* year using the declining-balance depreciation method. Round to the nearest whole dollar.
a. 28.57% b. \$248 c. \$619
8. Cashman Inc. purchased an overhead projector for \$560. It has an estimated useful life of 6 years, at which time it will have no remaining value. Find the book value at the end of 5 years using the declining-balance depreciation method. Round to the nearest whole dollar.
\$74

9. Shelley Corporation purchased a new machine for \$15,000. The estimated life of the machine is 12 years with a residual value of \$2,400. Find (a) the declining-balance depreciation rate as a fraction and as a percent (hundredth percent), (b) the amount of depreciation at the end of the first year, (c) the accumulated depreciation at the end of 7 years, and (d) the book value at the end of 9 years. Round to the nearest dollar.

a. $\frac{1}{6}$; 16.67% b. \$2,500 c. \$10,814 d. \$2,907

Learning Unit 17–4: Modified Accelerated Cost Recovery System (MACRS) with Introduction to ACRS (1986, 1989, 2010, 2020, 2023)

DRILL PROBLEMS

1. Using the MACRS method of depreciation, find the recovery rate, first-year depreciation expense, and book value of the asset at the end of the first year. Round to the nearest whole dollar.

Cost of asset	Recovery period	Recovery rate	Depreciation expense	End-of-year book value
a. \$2,500	3 years	<u>33%</u>	<u>\$825</u>	<u>\$1,675</u>
b. \$52,980	3 years	<u>33%</u>	<u>\$17,483</u>	<u>\$35,497</u>
c. \$4,250	5 years	<u>20%</u>	<u>\$850</u>	<u>\$3,400</u>
d. \$128,950	10 years	<u>10%</u>	<u>\$12,895</u>	<u>\$116,055</u>
e. \$13,775	5 years	<u>20%</u>	<u>\$2,755</u>	<u>\$11,020</u>

2. Find the accumulated depreciation at the end of the second year for each of the following assets. Round to the nearest whole dollar.

Cost of asset	Recovery period	Accumulated depreciation at end of 2nd year using MACRS	Book value at end of 2nd year using MACRS
a. \$2,500	3 years	<u>\$1,950</u>	<u>\$550</u>
b. \$52,980	3 years	<u>\$41,324</u>	<u>\$11,656</u>
c. \$4,250	5 years	<u>\$2,210</u>	<u>\$2,040</u>
d. \$128,950	10 years	<u>\$36,106</u>	<u>\$92,844</u>
e. \$13,775	5 years	<u>\$7,163</u>	<u>\$6,612</u>

WORD PROBLEMS

3. Colby Wayne paid \$7,750 for a photocopy machine that is classified as equipment and has a residual value of \$900. Prepare a depreciation schedule using the MACRS depreciation method. Round all calculations to the nearest whole dollar.

Depreciation in year 8 is \$346

4. Fox Realty bought a computer table for \$1,700. The table is classified as furniture. The residual value at the end of the table's useful life is \$370. Using the MACRS depreciation method, find (a) the amount of depreciation at the end of the *third* year, (b) the total accumulated depreciation at the end of year 3, and (c) the book value of the table at the end of the *third* year. Round all calculations to the nearest dollar.

a. \$297 b. \$956 c. \$744

5. Cashman Inc. purchased an overhead projector for \$560. It is classified as office equipment and will have no residual value. Find the book value at the end of 5 years using the MACRS depreciation method. Round to the nearest whole dollar.

\$125

6. Shelley Corporation purchased a new machine for \$15,000. The machine is comparable to equipment used for two-way exchange of voice and data with a residual value of \$2,400. Find (a) the amount of depreciation at the end of the first year, (b) the accumulated depreciation at the end of 7 years, and (c) the book value at the end of 9 years. Round to the nearest dollar.

a. \$750 b. \$7,470 c. \$5,760

- 7.* Wolfe Ltd. purchased a supercomputer for \$75,000 at the beginning of 1996. The computer is classified as a 5-year asset and will have a residual value of \$15,000. Using MACRS, find (a) the depreciation amount for 1996, (b) the accumulated depreciation at the end of 1997, (c) the book value at the end of 1998, and (d) the last year that the asset will be depreciated.

a. \$15,000 b. \$39,000 c. \$21,600 d. 2001

*These problems are placed here for a quick review.

- 8.* Cummins Engine Company uses a straight-line depreciation method to calculate the cost of an asset of \$1,200,000 with a \$200,000 residual value and a life expectancy of 15 years. How much would Cummins have for depreciation expense for each of the first 2 years? Round to the nearest dollar for each year.

$$\begin{aligned} \$1,200,000 - \$200,000 &= \frac{\$1,000,000}{15} = \$66,667 \text{ each year} \\ &\quad \times 2 \text{ years} \\ &\quad \underline{\$133,334 \text{ depreciation for 2 years}} \end{aligned}$$

- 9.* An article in an issue of *Management Accounting* stated that Cummins Engine Company changed its depreciation. The cost of its asset was \$1,200,000 with a \$200,000 residual value (with a life expectancy of 15 years) and an estimated productive capacity of 864,000 products. Cummins produced 59,000 products this year. What would it write off for depreciation using the units-of-production method?

Cost	Residual value
$\$1,200,000 - \$200,000 = \frac{\$1,000,000}{864,000} = \1.16 per product	
$\$1.16$	(estimated units
$\times 59,000$	of useful life
$\underline{\$68,440}$	production)

*These problems are placed here for a quick review.

Learning Unit 18–1: Assigning Costs to Ending Inventory—Specific Identification; Weighted Average; FIFO; LIFO

DRILL PROBLEMS

1. Given the value of the beginning inventory, purchases for the year, and ending inventory, find the cost of goods available for sale and the cost of goods sold.

Beginning inventory	Purchases	Ending inventory	Cost of goods available for sale	Cost of goods sold
a. \$1,000	\$4,120	\$2,100	<u>\$5,120</u>	<u>\$3,020</u>
b. \$52,400	\$270,846	\$49,700	<u>\$323,246</u>	<u>\$273,546</u>
c. \$205	\$48,445	\$376	<u>\$48,650</u>	<u>\$48,274</u>
d. \$78,470	\$2,788,560	\$100,600	<u>\$2,867,030</u>	<u>\$2,766,430</u>
e. \$965	\$53,799	\$2,876	<u>\$54,764</u>	<u>\$51,888</u>

2. Find the missing amounts; then calculate the number of units available for sale and the cost of the goods available for sale.

Date	Category	Quantity	Unit cost	Total cost
January 1	Beginning inventory	1,207	\$45	<u>\$ 54,315</u>
February 7	Purchase	850	\$46	<u>\$ 39,100</u>
April 19	Purchase	700	\$47	<u>\$ 32,900</u>
July 5	Purchase	1,050	\$49	<u>\$ 51,450</u>
November 2	Purchase	450	\$52	<u>\$ 23,400</u>
Goods available for sale		<u>4,257</u>		<u>\$201,165</u>

3. Using the *specific identification* method, find the ending inventory and cost of goods sold for the merchandising concern in Problem 2.

Remaining inventory	Unit cost	Total cost
20 units from beginning inventory	<u>\$45</u>	<u>\$ 900</u>
35 units from February 7	<u>\$46</u>	<u>\$ 1,610</u>
257 units from July 5	<u>\$49</u>	<u>\$ 12,593</u>
400 units from November 2	<u>\$52</u>	<u>\$ 20,800</u>
Cost of ending inventory		<u>\$ 35,903</u>
Cost of goods sold		<u>\$165,262</u>

4. Using the *weighted-average* method, find the average cost per unit (to the nearest cent) and the cost of ending inventory.

Units available for sale	Cost of goods available for sale	Units in ending inventory	Weighted-average unit cost	Cost of ending inventory
a. 2,350	\$120,320	1,265	<u>\$51.20</u>	<u>\$64,768</u>
b. 7,090	\$151,017	1,876	<u>\$21.30</u>	<u>\$39,958.80</u>
c. 855	\$12,790	989	<u>\$14.96</u>	<u>\$14,795.44</u>
d. 12,964	\$125,970	9,542	<u>\$9.72</u>	<u>\$92,748.24</u>
e. 235,780	\$507,398	239,013	<u>\$2.15</u>	<u>\$513,877.95</u>

5. Use the *FIFO* method of inventory valuation to determine the value of ending inventory, which consists of 40 units, and the cost of goods sold.

Date	Category	Quantity	Unit cost	Total cost
January 1	Beginning inventory	37	\$219.00	<u>\$ 8,103.00</u>
March 5	Purchases	18	230.60	<u>\$ 4,150.80</u>
June 17	Purchases	22	255.70	<u>\$ 5,625.40</u>
October 18	Purchases	34	264.00	<u>\$ 8,976.00</u>
Goods available for sale		<u>111</u>		<u>\$26,855.20</u>
Ending inventory =	<u>\$10,510.20</u>	Cost of goods sold =	<u>\$16,345</u>	

6. Use the *LIFO* method of inventory valuation to determine the value of the ending inventory, which consists of 40 units, and the cost of goods sold.

Date	Category	Quantity	Unit cost	Total cost
January 1	Beginning inventory	37	\$219.00	<u>\$ 8,103.00</u>
March 5	Purchases	18	230.60	<u>\$ 4,150.80</u>
June 17	Purchases	22	255.70	<u>\$ 5,625.40</u>
October 18	Purchases	34	264.00	<u>\$ 8,976.00</u>
Goods available for sale		<u>111</u>		<u>\$26,855.20</u>
Ending inventory =	<u>\$8,794.80</u>	Cost of goods sold =	<u>\$18,060.40</u>	

WORD PROBLEMS

7. At the beginning of September, Green's of Gloucester had 13 yellow raincoats in stock. These raincoats cost \$36.80 each. During the month, Green's purchased 14 raincoats for \$37.50 each and 16 raincoats for \$38.40 each, and it sold 26 raincoats. Calculate (a) the average unit cost rounded to the nearest cent and (b) the ending inventory value using the weighted-average method.

a. \$37.62 b. \$639.54

8. If Green's of Gloucester (Problem 7) used the FIFO method, what would the value of the ending inventory be?

\$651.90

9. If Green's of Gloucester (Problem 7) used the LIFO method, what would the value of the ending inventory be?

\$628.40

10. Hobby Caterers purchased recycled-paper sketch pads during the year as follows:

January	350 pads for \$.27 each
March	400 pads for \$.31 each
July	200 pads for \$.36 each
October	850 pads for \$.26 each
November	400 pads for \$.31 each

At the end of the year, the company had 775 of these sketch pads in stock. Find the ending inventory value using (a) the weighted-average method (round to the nearest cent), (b) the FIFO method, and (c) the LIFO method.

a. \$224.75 b. \$221.50 c. \$227.50

11. On March 1, Sandler's Shoe Store had the following sports shoes in stock:

13 pairs running shoes for \$33 a pair
 22 pairs walking shoes for \$29 a pair
 35 pairs aerobic shoes for \$26 a pair
 21 pairs cross-trainers for \$52 a pair

During the month Sandler's sold 10 pairs of running shoes, 15 pairs of walking shoes, 28 pairs of aerobic shoes, and 12 pairs of cross-trainers. Use the specific identification method to find (a) the cost of the goods available for sale, (b) the value of the ending inventory, and (c) the cost of goods sold.

a. \$3,069 b. \$952 c. \$2,117

Learning Unit 18–2: Retail Method; Gross Profit Method; Inventory Turnover; Distribution of Overhead

DRILL PROBLEMS

1. Given the following information, calculate (a) the goods available for sale at cost and retail, (b) the cost ratio (to the nearest thousandth), (c) the ending inventory at retail, and (d) the cost of the March 31 inventory (to the nearest dollar) by the retail inventory method.

	Cost	Retail	
Beginning inventory, March 1	\$57,300	\$95,500	a. \$85,700; \$143,500
Purchases during March	\$28,400	\$48,000	b. 0.597
Sales during March		\$79,000	c. \$64,500
			d. \$38,507

2. Given the following information, use the gross profit method to calculate (a) the cost of goods available for sale, (b) the cost percentage, (c) the estimated cost of goods sold, and (d) the estimated cost of the inventory as of April 30.

Beginning inventory, April 1	\$30,000	a. \$111,800
Net purchases during April	81,800	b. 60%
Sales during April	98,000	c. \$58,800
Average gross profit on sales	40%	d. \$53,000

3. Given the following information, find the average inventory.

Merchandise inventory, January 1, 20XX	\$82,000	\$85,000
Merchandise inventory, December 31, 20XX	\$88,000	

4. Given the following information, find the inventory turnover for the company in Problem 3 to the nearest hundredth.

Cost of goods sold (12/31/XX)	\$625,000	7.35
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5. Given the following information, calculate the (a) average inventory at retail, (b) average inventory at cost, (c) inventory turnover at retail, and (d) inventory turnover at cost. Round to the nearest hundredth.

	Cost	Retail	
Merchandise inventory, January 1	\$ 250,000	\$ 355,000	a. \$342,000
Merchandise inventory, December 31	\$ 235,000	\$ 329,000	b. \$242,500
Cost of goods sold	\$1,525,000		c. 5.85
Sales		\$2,001,000	d. 6.29

6. Given the floor space for the following departments, find the entire floor space and the percent each department represents.

		Percent of floor space
Department A	15,000 square feet	30%
Department B	25,000 square feet	50%
Department C	10,000 square feet	20%
Total floor space	50,000 square feet	100%

7. If the total overhead for all the departments (Problem 6) is \$200,000, how much of the overhead expense should be allocated to each department?

	Overhead/department
Department A	\$ 60,000
Department B	\$100,000
Department C	\$ 40,000

WORD PROBLEMS

8. During the accounting period, Ward's Greenery sold \$290,000 of merchandise at marked retail prices. At the end of the period, the following information was available from Ward's records:

	Cost	Retail
Beginning inventory	\$ 53,000	\$ 79,000
Net purchases	\$204,000	\$280,000

Use the retail method to estimate Ward's ending inventory at cost. Round the cost ratio to the nearest thousandth.

\$49,404

9. On January 1, Benny's Retail Mart had a \$49,000 inventory at cost. During the first quarter of the year, Benny's made net purchases of \$199,900. Benny's records show that during the past several years, the store's gross profit on sales has averaged 35%. If Benny's records show \$275,000 in sales for the quarter, estimate the ending inventory for the first quarter, using the gross profit method.

\$70,150

10. On April 4, there was a big fire and the entire inventory of R. W. Wilson Company was destroyed. The company records were salvaged. They showed the following information:

Sales (January 1 through April 4)	\$127,000
Merchandise inventory, January 1	16,000
Net purchases	71,250

On January 1, the inventory was priced to sell for \$38,000 and additional items bought during the period were priced to sell for \$102,000. Using the retail method, calculate the cost of the inventory that was destroyed by the fire. Round the cost ratio to the nearest thousandth.

\$8,099

11. During the past 4 years, the average gross margin on sales for R. W. Wilson Company was 36% of net sales. Using the data in Problem 10 and the gross profit method, calculate the cost of the ending inventory destroyed by fire.

\$5,970

12. Chase Bank has to make a decision on whether to grant a loan to Sally's Furniture Store. The lending officer is interested in how often Sally's inventory turns over. Using selected information from Sally's income statement, calculate the inventory turnover for Sally's Furniture Store (to the nearest hundredth).

Merchandise inventory, January 1	\$ 43,000
Merchandise inventory, December 31	55,000
Cost of goods sold	128,000

2.61 times

13. Wanting to know more about a business he was considering buying, Jake Paige studied the business's books. He found that beginning inventory for the previous year was \$51,000 at cost and \$91,800 at retail, ending inventory was \$44,000 at cost and \$72,600 at retail, sales were \$251,000, and cost of goods sold was \$154,000. Using this information, calculate for Jake the inventory turnover at cost and the inventory turnover at retail.

3.24 times (at cost)

3.05 times (at retail)

14. Ralph's Retail Outlet has calculated its expenses for the year. Total overhead expenses are \$147,000. Ralph's accountant must allocate this overhead to four different departments. Given the following information regarding the floor space occupied by each department, calculate how much overhead expense should be allocated to each department.

Department W	12,000 square feet	\$42,000	Department Y	14,000 square feet	\$49,000
Department X	9,000 square feet	\$31,500	Department Z	7,000 square feet	\$24,500

15. How much overhead would be allocated to each department of Ralph's Retail Outlet (Problem 14) if the basis of allocation were the sales of each department? Sales for each of the departments were:

Department W	\$110,000	\$32,340	Department Y	\$170,000	\$49,980
Department X	\$120,000	\$35,280	Department Z	\$100,000	\$29,400

Learning Unit 19–1: Sales and Excise Taxes**DRILL PROBLEMS**

1. Calculate the sales tax and the total amount due for each of the following:

Total sales	Sales tax rate	Sales tax	Total amount due
a. \$536	5%	<u>\$26.80</u>	<u>\$562.80</u>
b. \$11,980	6%	<u>\$718.80</u>	<u>\$12,698.80</u>
c. \$3,090	$8\frac{1}{4}\%$	<u>\$254.93</u>	<u>\$3,344.93</u>
d. \$17.65	$5\frac{1}{2}\%$	<u>\$0.97</u>	<u>\$18.62</u>
e. \$294	7.42%	<u>\$21.81</u>	<u>\$315.81</u>

2. Find the amount of actual sales and amount of sales tax on the following total receipts:

Total receipts	Sales tax rate	Actual sales	Sales tax
a. \$27,932.15	5.5%	<u>\$26,475.97</u>	<u>\$1,456.18</u>
b. \$35,911.53	7%	<u>\$33,562.18</u>	<u>\$2,349.35</u>
c. \$115,677.06	$6\frac{1}{2}\%$	<u>\$108,616.95</u>	<u>\$7,060.11</u>
d. \$142.96	$5\frac{1}{4}\%$	<u>\$135.83</u>	<u>\$7.13</u>
e. \$5,799.24	4.75%	<u>\$5,536.27</u>	<u>\$262.97</u>

3. Find the sales tax, excise tax, and total cost for each of the following items:

Retail price	Sales tax, 5.2%	Excise tax, 11%	Total cost
a. \$399	<u>\$20.75</u>	<u>\$43.89</u>	<u>\$463.64</u>
b. \$22,684	<u>\$1,179.57</u>	<u>\$2,495.24</u>	<u>\$26,358.81</u>
c. \$7,703	<u>\$400.56</u>	<u>\$847.33</u>	<u>\$8,950.89</u>

4. Calculate the amount, subtotal, sales tax, and total amount due of the following:

Quantity	Description	Unit price	Amount
3	Taxable item	\$4.30	<u>\$12.90</u>
2	Taxable item	\$5.23	<u>\$10.46</u>
4	Taxable item	\$1.20	<u>\$ 4.80</u>
	Subtotal		<u>\$28.16</u>
	5% sales tax		<u>1.41</u>
	Total		<u>\$29.57</u>

5. Given the sales tax rate and the amount of the sales tax, calculate the price of the following purchases (before tax was added):

Tax rate	Tax amount	Price of purchase
a. 7%	\$71.61	<u>\$1,023</u>
b. $5\frac{1}{2}\%$	\$3.22	<u>\$58.55</u>

6. Given the sales tax rate and the total price (including tax), calculate the price of the following purchases (before the tax was added):

Tax rate	Total price	Price of purchase
a. 5%	\$340.20	<u>\$324</u>
b. 6%	\$1,224.30	<u>\$1,155</u>

WORD PROBLEMS

7. In a state with a 4.75% sales tax, what will be the sales tax and the total price of a video game marked \$110?
\$5.23 sales tax \$115.23 total price
8. Browning's invoice included a sales tax of \$38.15. If the sales tax rate is 6%, what was the total cost of the taxable goods on the invoice?
\$635.83
9. David Bowan paid a total of \$2,763 for a new computer. If this includes a sales tax of 5.3%, what was the marked price of the computer?
\$2,623.93
10. After a 5% sales tax and a 12% excise tax, the total cost of a leather jacket was \$972. What was the selling price of the jacket?
\$830.77
11. A customer at the RDM Discount Store purchased four tubes of toothpaste priced at \$1.88 each, six toothbrushes for \$1.69 each, and three bottles of shampoo for \$2.39 each. What did the customer have to pay if the sales tax is $5\frac{1}{2}\%$?
\$26.20
12. Sean Masaki purchased a mountain bike for \$875. Sean had to pay a sales tax of 6% and an excise tax of 11%. What was the total amount Sean had to pay for his mountain bike?
\$1,023.75
13. Donna DeCoff received a bill for \$754 for a new chair she had purchased. The bill included a 6.2% sales tax and a delivery charge of \$26. What was the selling price of the chair?
\$685.50

Learning Unit 19–2: Property Tax

DRILL PROBLEMS

1. Find the assessed value of the following properties, rounding to the nearest whole dollar:

Market value	Assessment rate	Assessed value	Market value	Assessment rate	Assessed value
a. \$195,000	35%	\$68,250	d. \$2,585,400	65%	\$1,680,510
b. \$1,550,900	50%	\$775,450	e. \$349,500	85%	\$297,075
c. \$75,000	75%	\$56,250			

2. Find the tax rate for each of the following municipalities, rounding to the nearest tenth of a percent:

Budget needed	Total assessed value	Tax rate	Budget needed	Total assessed value	Tax rate
a. \$2,594,000	\$44,392,000	5.8%	d. \$13,540,000	\$143,555,500	9.4%
b. \$17,989,000	\$221,900,000	8.1%	e. \$1,099,000	\$12,687,000	8.7%
c. \$6,750,000	\$47,635,000	14.2%			

3. Express each of the following tax rates in all the indicated forms:

By percent	Per \$100 of assessed value	Per \$1,000 of assessed value	In mills
a. 7.45%	\$7.45	\$74.50	74.50
b. 14.24%	\$14.24	\$142.40	142.40
c. 9.08%	\$9.08	\$90.80	90.8
d. 6.2%	\$6.20	\$62.00	62

4. Calculate the property tax due for each of the following:

Total assessed value	Tax rate	Total property tax due	Total assessed value	Tax rate	Total property tax due
a. \$12,900	\$6.60 per \$100	\$851.40	e. \$78,900	59 mills	\$4,655.10
b. \$175,400	43 mills	\$7,542.20	f. \$225,550	\$11.39 per \$1,000	\$2,569.01
c. \$320,500	2.7%	\$8,653.50	g. \$198,750	\$2.63 per \$100	\$5,227.13
d. \$2,480,000	\$17.85 per \$1,000	\$44,268.00			

WORD PROBLEMS

- The county of Chelsea approved a budget of \$3,450,000, which had to be raised through property taxation. If the total assessed value of properties in the county of Chelsea was \$37,923,854, what will the tax rate be? The tax rate is stated per \$100 of assessed valuation.
\$9.10
- Linda Tawse lives in Camden and her home has a market value of \$235,000. Property in Camden is assessed at 55% of its market value, and the tax rate for the current year is \$64.75 per \$1,000. What is the assessed valuation of Linda's home?
\$129,250
- Using the information in Problem 6, find the amount of property tax that Linda will have to pay.
\$8,368.94
- Mary Faye Souza has property with a fair market value of \$219,500. Property in Mary Faye's city is assessed at 65% of its market value and the tax rate is \$3.64 per \$100. How much is Mary Faye's property tax due?
\$5,193.37
- Cagney's Greenhouse has a fair market value of \$1,880,000. Property is assessed at 35% by the city. The tax rate is 6.4%. What is the property tax due for Cagney's Greenhouse?
\$42,112
- In Chester County, property is assessed at 40% of its market value, the residential tax rate is \$12.30 per \$1,000, and the commercial tax rate is \$13.85 per \$1,000. What is the property tax due on a home that has a market value of \$205,000?
\$1,008.60
- Using the information in Problem 10, find the property tax due on a grocery store with a market value of \$5,875,000.
\$32,547.50
- Bob Rose's home is assessed at \$195,900. Last year the tax rate was 11.8 mills, and this year the rate was raised to 13.2 mills. How much more will Bob have to pay in taxes this year?
\$274.26

Learning Unit 20–1: Life Insurance**DRILL PROBLEMS**

- Use the table in the *Business Math Handbook* to find the annual premium per \$1,000 of life insurance and calculate the annual premiums for each policy listed. Assume the insureds are males.

Face value of policy	Type of insurance	Age at issue	Annual premium per \$1,000	Number of \$1,000s in face value	Annual premium
a. \$25,000	Straight life	31	\$9.27	25	\$231.75
b. \$40,500	20-year endowment	40	\$33.36	40.5	\$1,351.08
c. \$200,000	Straight life	44	\$17.86	200	\$3,572
d. \$62,500	20-payment life	25	\$9.91	62.5	\$619.38
e. \$12,250	5-year term	35	\$2.23	12.25	\$27.32
f. \$42,500	20-year endowment	42	\$36.59	42.5	\$1,555.08

- Use Table 20–1 to find the annual premium for each of the following life insurance policies. Assume the insured is a 30-year-old male.

Face value of policy	Five-year term policy	Straight life policy	Twenty-payment life policy	Twenty-year endowment
a. \$50,000	\$93.50	\$442.50	\$602.50	\$1,045.00
b. \$1,000,000	\$1,870.00	\$8,850.00	\$12,050.00	\$20,900.00
c. \$250,000	\$467.50	\$2,212.50	\$3,012.50	\$5,225.00
d. \$72,500	\$135.58	\$641.63	\$873.63	\$1,515.25

- Use the table in the *Business Math Handbook* to find the annual premium for each of the following life insurance policies. Assume the insured is a 30-year-old female.

Face value of policy	Five-year term policy	Straight life policy	Twenty-payment life policy	Twenty-year endowment
a. \$50,000	\$93.00	\$387.50	\$535.00	\$916.50
b. \$1,000,000	\$1,860.00	\$7,750.00	\$10,700.00	\$18,330.00
c. \$250,000	\$465.00	\$1,937.50	\$2,675.00	\$4,582.50
d. \$72,500	\$134.85	\$561.88	\$775.75	\$1,328.93

4. Use the table in the *Business Math Handbook* to find the nonforfeiture options for the following policies:

Years policy in force	Type of policy	Face value	Cash value	Amount of paid-up insurance	Extended term
a. 10	Straight life	\$25,000	<u>\$2,400</u>	<u>\$6,475</u>	<u>18 yrs 76 days</u>
b. 20	20-year endowment	\$500,000	<u>\$500,000</u>	<u>\$500,000</u>	<u>Life</u>
c. 5	20-payment life	\$2,000,000	<u>\$142,000</u>	<u>\$440,000</u>	<u>19 yrs 190 days</u>
d. 15	Straight life	\$750,000	<u>\$111,000</u>	<u>\$278,250</u>	<u>20 yrs 165 days</u>
e. 5	20-year endowment	\$93,500	<u>\$8,602</u>	<u>\$21,411.50</u>	<u>23 yrs 140 days</u>

WORD PROBLEMS

5. If Mr. Davis, aged 39, buys a \$90,000 straight-life policy, what is the amount of his annual premium?
\$1,242.90
6. If Miss Jennie McDonald, age 27, takes out a \$65,000 20-year endowment policy, what premium amount will she pay each year?
\$1,043.25
7. If Gary Thomas decides to cash in his \$45,000 20-payment life insurance policy after 15 years, what cash surrender value will he receive?
\$14,265
8. Mary Allyn purchased a \$70,000 20-year endowment policy when she was 26 years old. Ten years later, she decided that she could no longer afford the premiums. If Mary decides to convert her policy to paid-up insurance, what amount of paid-up insurance coverage will she have?
\$36,400
9. Peter and Jane Rizzo are both 28 years old and are both planning to take out \$50,000 straight-life insurance policies. What is the difference in the annual premiums they will have to pay?
\$47.50
10. Paul Nasser purchased a \$125,000 straight-life policy when he was 30 years old. He is now 50 years old. Two months ago, he slipped in the bathtub and injured his back; he will not be able to return to his regular job for several months. Due to a lack of income, he feels that he can no longer continue to pay the premiums on his life insurance policy. If Paul decides to surrender his policy for cash, how much cash will he receive?
\$33,125
11. If Paul Nasser (Problem 10) chooses to convert his policy to paid-up insurance, what will the face value of his new policy be?
\$68,750

Learning Unit 20–2: Fire Insurance

DRILL PROBLEMS

1. Use the tables in the *Business Math Handbook* to find the premium for each of the following:

Rating of area	Building class	Building value	Value of contents	Total annual premium
a. 3	A	\$80,000	\$32,000	<u>\$488</u>
b. 2	B	\$340,000	\$202,000	<u>\$2,912</u>
c. 2	A	\$221,700	\$190,000	<u>\$1,624.61</u>
d. 1	B	\$96,400	\$23,400	<u>\$521.60</u>
e. 3	B	\$65,780	\$62,000	<u>\$804.26</u>

2. Use the tables in the *Business Math Handbook* to find the short-term premium and the amount of refund due if the insured cancels.

Annual premium	Months of coverage	Short-term premium	Refund due
a. \$1,860	3	<u>\$651</u>	<u>\$1,209</u>
b. \$650	7	<u>\$435.50</u>	<u>\$214.50</u>
c. \$1,200	10	<u>\$1,044</u>	<u>\$156</u>
d. \$341	12	<u>\$341</u>	<u>None</u>
e. \$1,051	4	<u>\$462.44</u>	<u>\$588.56</u>

3. Find the amount to be paid for each of the following losses:

Property value	Coinsurance clause	Insurance required	Insurance carried	Amount of loss	Insurance company pays (indemnity)
a. \$85,000	80%	<u>\$68,000</u>	\$70,000	\$60,000	<u>\$60,000</u>
b. \$52,000	80%	<u>\$41,600</u>	\$45,000	\$50,000	<u>\$45,000</u>
c. \$44,000	80%	<u>\$35,200</u>	\$33,000	\$33,000	<u>\$30,937.50</u>
d. \$182,000	80%	<u>\$145,600</u>	\$127,400	\$61,000	<u>\$53,375</u>

WORD PROBLEMS

4. Mary Rose wants to purchase fire insurance for her building, which is rated as Class B; the rating of the area is 2. If her building is worth \$225,000 and the contents are worth \$70,000, what will her annual premium be?
\$1,545
5. Janet Ambrose owns a Class A building valued at \$180,000. The contents of the building are valued at \$145,000. The territory rating is 3. What is her annual fire insurance premium?
\$1,463
6. Jack Altshuler owns a building worth \$355,500. The contents are worth \$120,000. The classification of the building is B, and the rating of the area is 1. What annual premium must Jack pay for his fire insurance?
\$2,105.55
7. Jay Viola owns a store valued at \$460,000. His fire insurance policy (which has an 80% coinsurance clause) has a face value of \$345,000. A recent fire resulted in a loss of \$125,000. How much will the insurance company pay?
\$117,187.50
8. The building that is owned by Tally's Garage is valued at \$275,000 and is insured for \$225,000. The policy has an 80% coinsurance clause. If there is a fire in the building and the damages amount to \$220,000, how much of the loss will be paid for by the insurance company?
\$220,000
9. Michael Dannon owns a building worth \$420,000. He has a fire insurance policy with a face value of \$336,000 (there is an 80% coinsurance clause). There was recently a fire that resulted in a \$400,000 loss. How much money will he receive from the insurance company?
\$336,000
10. Rice's Rent-A-Center business is worth \$375,000. He has purchased a \$250,000 fire insurance policy. The policy has an 80% coinsurance clause. What will Rice's reimbursement be (a) after a \$150,000 fire and (b) after a \$330,000 fire?
a. \$125,000 b. \$250,000
11. If Maria's Pizza Shop is valued at \$210,000 and is insured for \$147,000 with a policy that contains an 80% coinsurance clause, what settlement is due after a fire that causes (a) \$150,000 in damages and (b) \$175,000 in damages?
a. \$131,250 b. \$147,000

Learning Unit 20–3: Auto Insurance

DRILL PROBLEMS

1. Calculate the annual premium for compulsory coverage for each of the following.

Driver classification	Bodily	Property	Total premium
a. 17	<u>\$98</u>	<u>\$160</u>	<u>\$258</u>
b. 20	<u>\$116</u>	<u>\$186</u>	<u>\$302</u>
c. 10	<u>\$55</u>	<u>\$129</u>	<u>\$184</u>

2. Calculate the amount of money the insurance company and the driver should pay for each of the following accidents, assuming the driver carries compulsory insurance only.

Accident and court award	Insurance company pays	Driver pays
a. Driver hit one person and court awarded \$15,000.	<u>\$10,000</u>	<u>\$5,000</u>
b. Driver hit one person and court awarded \$12,000 for personal injury.	<u>\$10,000</u>	<u>\$2,000</u>
c. Driver hit two people; court awarded first person \$9,000 and the second person \$12,000.	<u>\$19,000</u>	<u>\$2,000</u>

3. Calculate the additional premium payment for each of the following options.

Optional insurance coverage	Addition to premium
a. Bodily injury 50/100/25, driver class 20	<u>\$312</u>
b. Bodily injury 25/60/10, driver class 17	<u>\$233</u>
c. Collision insurance, driver class 10, age group 3, symbol 5, deductible \$100	<u>\$181</u>
d. Comprehensive insurance, driver class 10, age group 3, symbol 5, deductible \$200	<u>\$59</u>
e. Substitute transportation, towing, and labor; driver class 10, age group 3, symbol 5	<u>\$20</u>

4. Compute the annual premium for compulsory insurance with optional liability coverage for bodily injury and damage to someone else's property.

Driver classification	Bodily coverage	Premium
a. 17	50/100/25	<u>\$528</u>
b. 20	100/300/10	<u>\$661</u>
c. 10	25/60/25	<u>\$365</u>
d. 18	250/500/50	<u>\$601</u>
e. 20	25/50/10	<u>\$565</u>

5. Calculate the annual premium for each of the following drivers with the indicated options. All drivers must carry compulsory insurance.

Driver classification	Car age	Car symbol	Bodily injury	Collision	Comprehensive	Transportation and towing	Annual premium
a. 10	2	4	50/100/10	\$100 deductible	\$300 deductible	Yes	<u>\$647</u>
b. 18	3	2	25/60/25	\$200 deductible	\$200 deductible	Yes	<u>\$706</u>

WORD PROBLEMS

6. Ann Centerino's driver classification is 10. She carries only compulsory insurance coverage. What annual insurance premium must she pay?
\$184
7. Gary Hines is a class 18 driver. He wants to add optional bodily injury and property damage of 250/500/50 to his compulsory insurance coverage. What will be Gary's total annual premium?
\$601
8. Sara Goldberg wants optional bodily injury coverage of 50/100/25 and collision coverage with a deductible of \$300 in addition to the compulsory coverage her state requires. Sara is a class 17 driver and has a symbol 4 car that is 2 years old. What annual premium must Sara pay?
\$688
9. Karen Babson has just purchased a new car with a symbol of 8. She wants bodily injury and property liability of 500/1,000/100, comprehensive and collision insurance with a \$200 deductible, and transportation and towing coverage. If Karen is a class 10 driver, what will be her annual insurance premium? There is no compulsory insurance requirement in her state. Assume age group 1.
\$781
10. Craig Haberland is a class 18 driver. He has a 5-year-old car with a symbol of 4. His state requires compulsory insurance coverage. In addition, he wishes to purchase collision and comprehensive coverage with the maximum deductible. He also wants towing insurance. What will Craig's annual insurance premium be?
\$415
11. Nancy Poland has an insurance policy with limits of 10/20. If Nancy injures a pedestrian and the judge awards damages of \$18,000, (a) how much will the insurance company pay and (b) how much will Nancy pay?
a. \$10,000 b. \$8,000
12. Peter Bell carries insurance with bodily injury limits of 25/60. Peter is in an accident and is charged with injuring four people. The judge awards damages of \$10,000 to each of the injured parties. How much will the insurance company pay? How much will Peter pay?
Company pays \$40,000. Peter pays \$0.
13. Jerry Greeley carries an insurance policy with bodily injury limits of 25/60. Jerry is in an accident and is charged with injuring four people. If the judge awards damages of \$20,000 to each of the injured parties, (a) how much will the insurance company pay and (b) how much will Jerry pay?
a. \$60,000 b. \$20,000

14. An issue of *Your Money* reported that the Illinois Department of Insurance gave a typical premium for a brick house in Chicago built in 1950, assuming no policy discounts and a replacement cost estimated at \$100,000. With a \$100 deductible, the annual premium will be \$653. Using the rate in your textbook, with a rating area 3 and class B, what would be the annual premium? (This problem reviews fire insurance.)

Insured value

$$\frac{\$100,000}{\$100} = 1,000 \times \$0.61 = \$610.00$$

15. An issue of *Money* ran a story on cutting car insurance premiums. Raising the car insurance deductible to \$500 will cut the collision premium 15%. Theresa Mendex insures her car; her age group is 5 and symbol is 5. What would be her reduction if she changed her policy to a \$500 deductible? What would the collision insurance now cost?

$$\begin{array}{r} \$130.00 \\ \times .15 \\ \hline \$19.50 \text{ reduction} \end{array} \qquad \begin{array}{r} \$130.00 \\ - 19.50 \\ \hline \$110.50 \end{array}$$

16. Robert Stuono lost his life insurance when he was downsized from an investment banking company early this year. Stuono, age 44, enlisted the help of an independent agent who works with several insurance companies. His goal is \$350,000 in term coverage with a level premium for 5 years. What will Robert's annual premium be for term insurance? (This problem reviews life insurance.)

$$\frac{\$350,000 \text{ coverage}}{\$1,000} = \begin{array}{c} 350 \\ \uparrow \\ \text{Number} \\ \text{in} \\ \text{thousands} \end{array} \times \begin{array}{c} \$4.50 \\ \uparrow \\ \text{Cost per} \\ \text{thousand} \\ \text{at age 44} \end{array} = \begin{array}{c} \$1,575 \\ \uparrow \\ \text{Annual} \\ \text{premium} \end{array}$$

Learning Unit 21–1: Stocks**DRILL PROBLEMS**

52 weeks		Stocks	SYM	Div	Yld %	PE	Vol 100s	High	Low	Close	Net chg
Hi	Lo										
43.88	25.51	Disney	DIS	.21	.8	49	49633	27.69	26.50	27.69	+0.63

- From the listed information for Disney, complete the following:
 - \$43.88 was the highest price at which Disney stock traded during the year.
 - \$25.51 was the lowest price at which Disney stock traded during the year.
 - \$.21 was the amount of the dividend Disney paid to shareholders last year.
 - \$.21 is the dividend amount a shareholder with 100 shares would receive.
 - .8% is the rate of return the stock yielded to its stockholders.
 - 49 is how many times its earnings per share the stock is selling for.
 - 4,963,300 is the number of shares traded on the day of this stock quote.
 - \$27.69 is the highest price paid for Disney stock on this day.
 - \$26.50 is the lowest price paid for Disney stock on this day.
 - +\$0.63 is the change in price from yesterday's closing price.

- Use the Disney information to show how the yield percent was calculated.

$$\$0.21 \div \$27.69 = .8\%$$

- What was the price of the last trade of Disney stock yesterday?

$$\begin{array}{r} \$27.69 \\ - .63 \\ \hline \$27.06 \end{array}$$

WORD PROBLEMS

- Assume a stockbroker's commission of 2%. What will it cost to purchase 200 shares of Sapient Corporation at \$10.75?
 $200 \text{ shares} \times \$10.75 = \$2,150$
 $\$2,150 \times 1.02 = \$2,193$

5. In Problem 4, the stockbroker's commission for selling stock is the same as that for buying stock. If the customer who purchased 200 shares at \$10.75 sells the 200 shares of stock at the end of the year at \$18.12, what will be the gain on investment?

Sell \$3,551.52 ($200 \times \$18.12 = \$3,624 \times .98 = \$3,551.52$)
 Buy − 2,193.00
 Gain \$1,358.52

6. Holtz Corporation's records show 80,000 shares of preferred stock issued. The preferred dividend is \$2 per share, which is cumulative. The records show 750,000 shares of common stock issued. In 2021, no dividends were paid. In 2022, the board of directors declared a dividend of \$582,500. What are (a) the total amount of dividends paid to preferred stockholders, (b) the total amount of dividends paid to common stockholders, and (c) the amount of the common dividend per share?

a. \$320,000 b. \$262,500 c. \$.35

7. Emmy Cheoh bought 300 shares of Delta Air Lines stock listed at \$61.22 per share. What is the total amount she paid if the stockbroker's commission is 2.5%?

$300 \text{ shares} \times \$61.22 = \$18,366 \times 1.025 = \$18,825.15$

8. A year later, Emmy (Problem 7) sold the stock she had purchased. The market price of the stock at this time was \$72.43. Delta Air Lines had paid its shareholders a dividend of \$1.20 per share. If the stockbroker's commission to sell stock is 2.5%, what gain did Emmy realize?

$300 \text{ shares} \times \$72.43 = \$21,729 \times .975 = \$21,185.78 - \$18,825.15 = \$2,360.63 \text{ gain}$

9. The board of directors of Parker Electronics Inc. declared a \$539,000 dividend. If the corporation has 70,000 shares of common stock outstanding, what is the dividend per share?

\$7.70

Learning Unit 21–2: Bonds

DRILL PROBLEMS

Complete problems 1–5 using the following information:

Bond	Current yield	Sales	Close	Net change
IBM 10 $\frac{1}{4}$ 32	10.0	11	102.5	+ .125

1. From the bond listing above complete the following:

- a. IBM is the name of the company.
 b. 10 $\frac{1}{4}$ is the percent of interest paid on the bond.
 c. 2032 is the year in which the bond matures.
 d. \$102.50 is the total interest for the year. ($.1025 \times \$1,000 = \102.50)
 e. 102.375 was the previous day's closing price on the IBM bond.

2. Show how to calculate the current yield of 10.0% for IBM. (Trade commissions have been omitted.)

10.0% \$102.5
 \$1,025

3. Use the information for the IBM bond to calculate (a) the amount the last bond traded for on this day and (b) the amount the last bond traded for yesterday.

a. \$1,025 b. \$1,023.75

4. What will be the annual interest payment (a) to the bondholder assuming he paid 101 $\frac{3}{4}$ and (b) to the bondholder who purchased the bond for 102 $\frac{1}{2}$?

a. \$102.50 b. \$102.50

5. If Terry Gambol purchased three IBM bonds at this day's closing price, (a) what will be her total cost excluding commission and (b) how much interest will she receive for the year?

a. \$3,075 b. \$307.50

6. Calculate the bond yield (to the nearest tenth percent) for each of the following:

Bond interest rate	Purchase price	Bond yield
a. 7%	97	<u>7.2%</u>
b. 9 $\frac{1}{2}$ %	101.625	<u>9.3%</u>
c. 13 $\frac{1}{4}$ %	104.25	<u>12.7%</u>

7. For each of the following, state whether the bond sold at a premium or a discount and give the amount of the premium or discount.

Bond interest rate	Purchase price	Premium or discount
a. 7%	97	<u>\$30 discount</u>
b. $9\frac{1}{2}\%$	101.625	<u>\$16.25 premium</u>
c. $13\frac{1}{4}\%$	104.25	<u>\$42.50 premium</u>

WORD PROBLEMS

8. Rob Morrissey purchased a \$1,000 bond that was quoted at 102.25 and paying $8\frac{7}{8}\%$ interest. (a) How much did Rob pay for the bond? (b) What was the premium or discount? (c) How much annual interest will he receive?
a. \$1,022.50 b. \$22.50 c. \$88.75
9. Jackie Anderson purchased a bond that was quoted at 62.50 and paying interest of $10\frac{1}{2}\%$. (a) How much did Jackie pay for the bond? (b) What was the premium or discount? (c) What interest will Jackie receive annually? (d) What is the bond's current annual yield (to the nearest tenth percent)?
a. \$625 b. \$375 c. \$105 d. 16.8%
10. Swartz Company issued bonds totaling \$2,000,000 in order to purchase updated equipment. If the bonds pay interest of 11%, what is the total amount of interest the Swartz Company must pay semiannually?
\$110,000
11. The RJR and ACyan companies have both issued bonds that are paying $7\frac{3}{8}\%$ interest. The quoted price of the RJR bond is 94.125, and the quoted price of the ACyan bond is $102\frac{7}{8}$. Find the current annual yield on each (to the nearest tenth percent).
7.8% yield for RJR bond 7.2% yield for ACyan
12. Mary Estrada purchased 25 of Chrysler Corporation $8\frac{3}{8}\%$ bonds of 2035. The bonds closed at 93.25. Find (a) the total purchase price and (b) the amount of the first semiannual interest payment Mary will receive.
a. \$23,312.50 b. \$1,046.88
13. What is the annual yield (to the nearest hundredth percent) of the bonds Mary Estrada purchased (see Problem 12)?
8.98%
14. Mary Estrada purchased a \$1,000 bond listed as ARch $10\frac{7}{8}$ 28 for 122.75. What is the annual yield of this bond (to the nearest tenth percent)?
8.9%

Learning Unit 21–3: Mutual Funds

DRILL PROBLEMS

From the following, calculate the NAV. Round to the nearest cent.

Current market value of fund investments	Current liabilities	Number of shares outstanding	NAV
1. \$6,800,000	\$850,000	500,000	<u>\$11.90</u>
2. \$11,425,000	\$690,000	810,000	<u>\$13.25</u>
3. \$22,580,000	\$1,300,000	1,400,000	<u>\$15.20</u>

Complete the following using this information:

NAV	Net change	Fund name	Inv. obj.	YTD %Ret	Total return 1 Yr R
\$23.48	+.14	EuroA	Eu	+37.3	+7.6 E
4. NAV	<u>\$23.48</u>				
5. NAV change	<u>+.14</u>				
6. Total return year to date	<u>37.3%</u>				
7. Return for the last 12 months	<u>7.6%</u>				
8. What does an E rating mean?	<u>Lowest 20%</u>				

Calculate the commission (load) charge and the offer to buy.

	NAV	% commission (load) charge	Dollar amount of commission (load) charge	Offer price
9.	\$17.00	$8\frac{1}{2}\%$	<u>\$1.45</u>	<u>\$18.45</u>
10.	\$21.55	6%	<u>\$1.29</u>	<u>\$22.84</u>
11.	\$14.10	4%	<u>\$.56</u>	<u>\$14.66</u>

WORD PROBLEMS

12. Paul wanted to know how his Fidelity mutual fund \$14.33 NAV in the newspaper was calculated. He called Fidelity, and he received the following information:

Current market value of fund investment	\$7,500,000
Current liabilities	\$910,000
Number of shares outstanding	460,000

Please calculate the NAV for Paul. Was the NAV in the newspaper correct?

Yes.

13. Jeff Choi bought 150 shares of Putnam Vista Fund. The NAV of the fund was \$9.88. The offer price was \$10.49. What did Jeff pay for these 150 shares?

\$1,573.50

14. Pam Long purchased 300 shares of the no-load Scudder's European Growth Company Fund. The NAV is \$12.61. What did Pam pay for the 300 shares?

\$3,783

15. Assume in Problem 14 that 8 years later Pam sells her 300 shares. The NAV at the time of sale was \$12.20. What is the amount of her profit or loss on the sale?

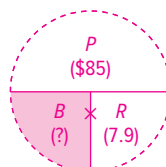
\$123 loss

16. Financial planner J. Michael Martin recommended that Jim Kelly choose a long-term bond because it gives high income while Kelly waits for better stock market opportunities down the road. The bond Martin recommended matures in 2030 and was originally issued at $8\frac{1}{2}\%$ interest and the current yield is 7.9%. What would be the current selling price for this bond and how would that price appear in the bond quotations?

Bond originally paid $8\frac{1}{2}\%$ interest $\times \$1,000 = \85 interest

$\$85 \div .079 = \$1,075.949 = \$1,076$

Bond would be listed as $107\frac{1}{2}$.



17. Bonds	Vol.	Close	Net chg.
Comp USA $9\frac{1}{2}$ 32	70	102.375	-.125
GMA 7 34	5	101.625	-1.25

From the above information, compare the two bonds for:

- When the bonds expire.
- The yield of each bond.
- The current selling price.
- Whether the bond is selling at a discount or premium.
- Yesterday's bond close.

a. Comp USA: Year 2032
GMA: Year 2034

b. Comp USA: $\frac{\$95 \text{ interest}}{\$1,023.75 \text{ close}} = 9.28\% \text{ or } 9.3\%$

GMA: $\frac{\$70 \text{ interest}}{\$1,016.25 \text{ close}} = 6.88\% \text{ or } 6.9\%$

c. Comp USA: $1.02375 \times \$1,000 = \$1,023.75$
GMA: $1.01625 \times \$1,000 = \$1,016.25$

d. Both selling at a premium (over \$1,000 face value)
($\$102.375 + .125$)

e. Comp USA: $\$102.50 = \$1,025$
GMA: $\$101.625 + \$1.25 = \$1,028.75$

Learning Unit 22–1: Mean, Median, and Mode

Note: Optional problems for LU 22–3 are found after the Challenge Problems in Chapter 22.

DRILL PROBLEMS

- Find the mean for the following lists of numbers. Round to the nearest hundredth.
 - 12, 16, 20, 25, 29 Mean 20.4
 - 80, 91, 98, 82, 68, 82, 79, 90 Mean 83.75
 - 9.5, 12.3, 10.5, 7.5, 10.1, 18.4, 9.8, 6.2, 11.1, 4.8, 10.6 Mean 10.07
- Find the weighted mean for the following. Round to the nearest hundredth.
 - 4, 4, 6, 8, 8, 13, 4, 6, 8 Weighted mean 6.78
 - 82, 85, 87, 82, 82, 90, 87, 63, 100, 85, 87 Weighted mean 84.55
- Find the median for the following:
 - 56, 89, 47, 36, 90, 63, 55, 82, 46, 81 Median 59.5
 - 59, 22, 39, 47, 33, 98, 50, 73, 54, 46, 99 Median 50
- Find the mode for the following:

24, 35, 49, 35, 52, 35, 52 Mode 35
- Find the mean, median, and mode for each of the following:
 - 72, 48, 62, 54, 73, 62, 75, 57, 62, 58, 78
Mean 63.7 Median 62 Mode 62
 - \$0.50, \$1.19, \$0.58, \$1.19, \$2.83, \$1.71, \$2.21, \$0.58, \$1.29, \$0.58
Mean \$1.27 Median \$1.19 Mode \$0.58
 - \$92, \$113, \$99, \$117, \$99, \$105, \$119, \$112, \$95, \$116, \$102, \$120
Mean \$107.42 Median \$108.50 Mode \$99
 - 88, 105, 120, 119, 105, 128, 160, 151, 90, 153, 107, 119, 105
Mean 119.23 Median 119 Mode 105

WORD PROBLEMS

- The sales for the year at the 8 Bed and Linen Stores were \$1,442,897, \$1,556,793, \$1,703,767, \$1,093,320, \$1,443,984, \$1,665,308, \$1,197,692, and \$1,880,443. Find the mean earnings for a Bed and Linen Store for the year.
\$1,498,025.50
- To avoid having an extreme number affect the average, the manager of Bed and Linen Stores (Problem 6) would like you to find the median earnings for the 8 stores.
\$1,500,388.50
- The Bed and Linen Store in Salem sells many different towels. Following are the prices of all the towels that were sold on Wednesday: \$7.98, \$9.98, \$9.98, \$11.49, \$11.98, \$7.98, \$12.49, \$12.49, \$11.49, \$9.98, \$9.98, \$16.00, and \$7.98. Find the mean price of a towel.
\$10.75
- Looking at the towel prices, the Salem manager (Problem 8) decided that he should have calculated a weighted mean. Find the weighted mean price of a towel.
\$10.75
- The manager of the Salem Bed and Linen Store (Problem 8) would like to find another measure of the central tendency called the *median*. Find the median price for the towels sold.
\$9.98
- The manager at the Salem Bed and Linen Store (Problem 8) would like to know the most popular towel among the group of towels sold on Wednesday. Find the mode for the towel prices for Wednesday.
\$9.98

Learning Unit 22–2: Frequency Distributions and Graphs

DRILL PROBLEMS

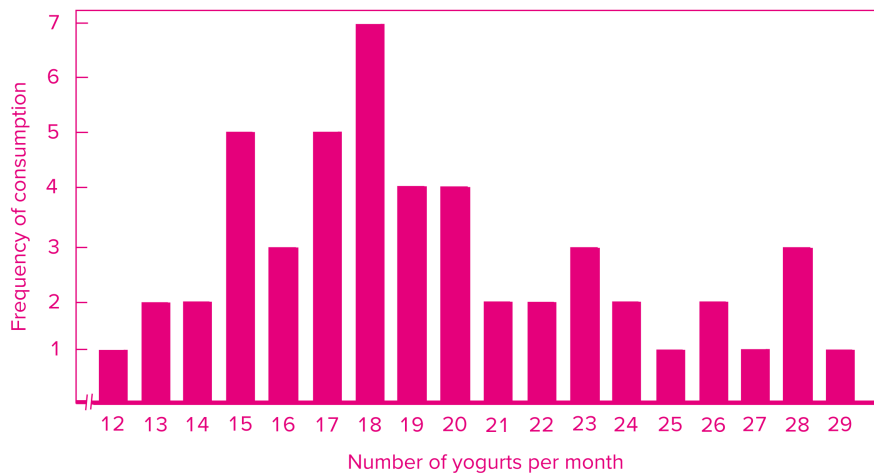
1. A local dairy distributor wants to know how many containers of yogurt health club members consume in a month. The distributor gathered the following data:

17	17	22	14	26	23	23	15	18	16
18	15	23	18	29	20	24	17	12	15
18	19	18	20	28	21	25	21	26	14
16	18	15	19	27	15	22	19	19	13
20	17	13	24	28	18	28	20	17	16

Construct a frequency distribution table to organize these data.

18 IIII II 7

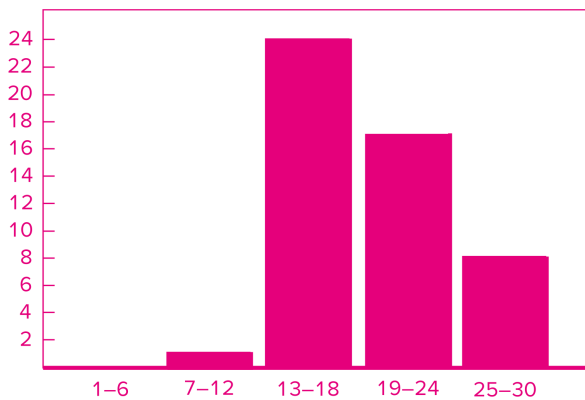
2. Construct a bar graph for the Problem 1 data. The height of each bar should represent the frequency of each amount consumed.



3. To simplify the amount of data concerning yogurt consumption, construct a relative frequency distribution table for the data in Problem 1. The range will be from 1 to 30 with five class intervals: 1–6, 7–12, 13–18, 19–24, and 25–30.

25–30 IIII III 8

4. Construct a bar graph for the grouped data in Problem 1.



5. Prepare a pie chart to represent the data in Problem 1.

7–12 $\frac{1}{50} \times 360^\circ = 7.2^\circ$

WORD PROBLEMS

6. The women's department of a local department store lists its total sales for the year: January, \$39,800; February, \$22,400; March, \$32,500; April, \$33,000; May, \$30,000; June, \$29,200; July, \$26,400; August, \$24,800; September, \$34,000; October, \$34,200; November, \$38,400; December, \$41,100. Draw a line graph to represent the monthly sales of the women's department for the year. The vertical axis should represent the dollar amount of the sales.



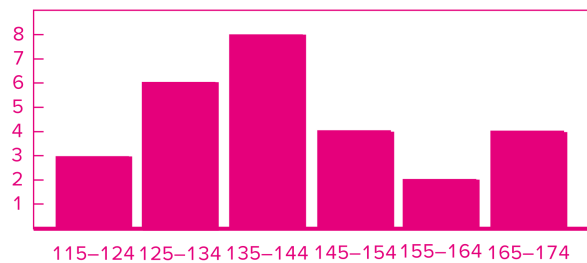
7. The following list shows the number of television sets sold in a year by the sales associates at Souza's TV and Appliance Store.

115	125	139	127	142	153	169	126	141
130	137	150	169	157	146	173	168	156
140	146	134	123	142	129	141	122	141

Construct a relative frequency distribution table to represent the data. The range will be from 115 to 174 with intervals of 10.

145–154 |||| 4

8. Use the data in the distribution table for Problem 7 to construct a bar graph for the grouped data.



9. Expenses for Flora Foley Real Estate Agency for the month of June were as follows: salaries expense, \$2,790; utilities expense, \$280; rent expense, \$2,000; commissions expense, \$4,800; and other expenses, \$340. Present these data in a circle graph. (First calculate the percent relationship between each item and the total; then determine the number of degrees that represents each item.)

98.4° 9.9° 70.5° 169.2° 11.9°

10. Today a new Jeep costs \$45,000. In 1970, the Jeep cost \$4,500. What is the price relative? (Round to the nearest tenth percent.)

$$\frac{\$45,000}{\$4,500} \times 100 = 1,000$$