**106.** min



**107.** 2532 ÷ 12 = 211  
$211 billion

**108.**   
24,480 ÷ 96 = 255  
Each crate weighs 255 lb.

**Problem Recognition Exercises: Operations on Whole Numbers**

**1. (a) **

**(b) **

**(c)** 

**(d)** 

**2. (a) **

**(b)** 

**(c)** 

**(d)** 

**3. (a) **

**(b) **

**4. (a)** 

**(b) **

**5. (a)** 

**(b)** 

**6. (a)** 

**(b)** 

**7. (a)** 

**(b)** 

**8. (a)** 

**(b)** 

**9. (a)** 

**(b)** 

**10. (a)** 

**(b)** 

**11. (a)** 

**(b)** 

**12. (a)** 

**(b)** 

**13. (a) **

**(b) **

**(c) **

**(d) **

**14. (a) **

**(b) **

**(c) **

**(d) **

**15.** 

**16.** 

**17.** 

**18.** 

**Section 1.7 Exponents, Algebraic Expressions, and the Order of Operations**

Section 1.7 Practice Exercises

**1.** Answers will vary.

**2. (a)** An **exponent** is used to represent repeated multiplication.

**(b)** **Power** is another word meaning exponent.

**(c)** The **base** is the number being raised to the exponent.

**(d)** A **power of 10** is 10 raised to a whole number exponent.

**(e)** A **square root** of a number is the number which when multiplied by itself gives the original number. For example, 5 is the square root of 25 because 5 ⋅ 5 = 25.

**(f)** **Variables** are used to represent quantities that are subject to change.

**(g)** Quantities that do not change are called **constants**.

**3.** True: 5 + 3 = 8 and 3 + 5 = 8

**4.** False: 5 − 3 = 2, but 3 − 5 ≠ 2

**5.** False: 6 × 0 = 0

**6.** True: 0 ÷ 8 = 0

**7.** True: 0 × 8 = 0

**8.** True: 5 ÷ 0 is undefined

**9.**



**10.**



**11.**



**12.**



**13.**



**14.**



**15.**



**16.**



**17.**



**18.**



**19.**



**20.**



**21.**



**22.**



**23.**



**24.**



**25.**



**26.** 

**27.**



**28.**



**29.**



**30.**



**31.** ; ; ; ; The number 1 raised to any power equals 1.



**32.**



**33.**



**34.**



**35.**



**36.**  simplifies to a 1 followed by 9 zeros: 1,000,000,000.

**37.** because 2 ⋅ 2 = 4.



**38.** because 3 ⋅ 3 = 9.



**39.** because 6 ⋅ 6 = 36.



**40.** because 9 ⋅ 9 = 81.



**41.** because 10 ⋅ 10 = 100.



**42.** because 7 ⋅ 7 = 49.



**43.** because 0 ⋅ 0 = 0.



**44.** because 4 ⋅ 4 = 16.



**45.** No, addition and subtraction should be performed in the order in which they appear from left to right.

**46.** No, multiplication and division should be performed in the order in which they appear from left to right.

**47.** 6 + 10 ⋅ 2 = 6 + 20 = 26

**48.** 4 + 3 ⋅ 7 = 4 + 21 = 25

**49.**



**50.**



**51.**



**52.**



**53.** 36 ÷ 2 ÷ 6 = 18 ÷ 6 = 3

**54.** 48 ÷ 4 ÷ 2 = 12 ÷ 2 = 6

**55.** 15 − (5 + 8) = 15 − 13 = 2

**56.** 41 − (13 + 8) = 41 − 21 = 20

**57.** (13 − 2) ⋅ 5 – 2 = 11 ⋅ 5 – 2 = 55 – 2 = 53

**58.** (8 + 4) ⋅ 6 + 8 = 12 ⋅ 6 + 8 = 72 + 8 = 80

**59.** 4 + 12 ÷ 3 = 4 + 4 = 8

**60.**



**61.**



**62.** 55 ÷ 11 ⋅ 5 = 5 ⋅ 5 = 25

**63.**



**64.**



**65.**



**66.**



**67. **

**68. **

**69. **

**70. **

**71.** 

**72.** 

**73.** 

**74.** 

**75.** 

**76.** 

**77.** 

**78.** 

**79.** 

**80.** 

**81.** 

**82.** 

**83. **

**84. **

**85. **

**86. **

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**89.**



**90.** 

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**92.**



**93.**



**94.** 

**95.** 

**96.** 

**97.** 

**98.** 

**99.** 

**100.** 

**101.** 

**102.**



**103.**



**104.**



**105.**



**106. **

**107. **

**108.** 

**109.**



**110.**



**111.**



**112.**



**113.**



**Section 1.8 Mixed Applications and Computing Mean**

Section 1.8 Practice Exercises

**1.** Answers will vary.

**2.** The **mean** of a set of values is the sum of the values divided by the number of values.

**3.** 71 + 14 = 85

**4.** 42 + 16 = 58

**5.** 2 ⋅ 14 = 28

**6.** 93 − 79 = 14

**7.** 102 − 32 = 70

**8.** 60 ÷ 12 = 5

**9.** 10 ⋅ 13 = 130

**10.** 12 + 14 + 15 = 41

**11.** 24 ÷ 6 = 4

**12. **

**13. **

**14.** *Given*: total price: $16,540  
down payment: $2500  
payment plan: 36 months  
*Find*: Amount of monthly payments  
*Operations*  
(1) Subtract



(2) Divide  
   
Jackson’s monthly payments were $390.



**15.** *Given*: total cost: 1170  
down payment: 150  
payment plan: 12 months  
*Find*: Amount of monthly payments  
*Operations*:  
(1) Subtract  
   
(2) Divide  
   
Lucio’s monthly payment was $85.



**16.** *Given*: Distance for each route and speed traveled  
*Find*: Time required for each route  
*Operations*  
(1) Watertown to Utica direct  
 *Divide* 80 ÷ 40 = 2 hr  
(2) Watertown to Syracuse to Utica  
 Add distances 70 + 50 = 120 mi  
 *Divide* 120 ÷ 60 = 2 hr  
Each trip will take 2 hours.

**17.** *Given*: Distance for each route and speed traveled  
*Find*: Time required for each route  
*Operations*  
(1) Interstate:  
 *Divide* 220 ÷ 55 = 4 hr  
(2) Back roads:  
 *Divide* 200 ÷ 40 = 5 hr  
The interstate will take 4 hours and the back roads will take 5 hours. The interstate will take less time.

**18.** The distance around a figure is the perimeter.

**19.** The amount of space covered is the area.

**20.** *Given*: The dimensions of a room and cost per foot of molding  
*Find*: Total cost  
*Operations*:  
(1) Add to find the perimeter, subtract   
 doorway.  
 ft  
(2) Multiply to find the total cost.  
   
The cost will be $86.



**21.** *Given*: The dimensions of a yard and the cost per foot of fence  
*Find*: Total cost  
*Operations*  
(1) Add to find perimeter  
  ft  
(2) Multiply the perimeter by cost per foot.  
   
It will cost $1650.

**22.** *Given*: dimensions of room and cost per square yard  
*Find*: total cost  
*Operations*  
(1) Multiply to find area  
   
(2) Multiply to find total cost  
   
The total cost is $1020.



**23.** *Given*: Dimensions of room and cost per foot  
*Find*: Total cost  
*Operations*  
(1) Multiply to find area.  
   
(2) Multiply to find total cost.  
   
The total cost is $720.



**24.** *Given*: Starting balance in account and individual checks written  
*Find*: Remaining balance in account  
*Operations*  
(1) Add the individual checks  
   
(2) Subtract $242 from the initial balance  
   
There will be $36 left in Gina’s account.



**25.** *Given*: Initial balance in account and individual checks written  
*Find*: The remaining balance  
*Operations*  
(1) Add the individual checks.  
   
(2) Subtract $779 from the initial balance.  
   
There will be $2676 left in Jose’s account.



**26.** *Given*: Number of computers and printers purchased and the cost of each  
*Find*: The total bill  
*Operations*  
(1) Multiply to find the amount spent on   
 computers, then printers.  
    
(2) Add to find the total bill.  
   
The total bill was $154,032.



**27.** *Given*: Price for children and adults, and the number of children and adults  
*Find*: Total cost for the trip  
*Operations*  
(1) Multiply to find the amount for children and for adults.  
  

(2) Add to find the total.  
   
The amount of money required is $924.

**28.** *Given*: Amount to sell used CDs, amount to buy used CDs and number of CDs sold

**(a)** *Find*: Money from selling 16 CDs  
*Operation*: Multiply  
  
Latayne will receive $48.



**(b)** *Find*: Number of used CDs to buy for $48.  
*Operation*: Division  
48 ÷ 8 = 6  
She can buy 6 CDs.

**29.** *Given*: Wage per hour and number of hours worked

**(a)** *Find*: Amount of weekly paycheck  
*Operation*: Multiply  
  
Shevona’s paycheck is worth $320.



**(b)** *Given*: Ticket price and number of tickets  
*Find*: Amount left over from paycheck  
*Operations*  
(1) Multiply   
(2) Subtract   
She will have $192 left.



**30.** *Given*: Number of field goals, three-point shots and free throws and point values  
*Find*: Total points scored  
*Operations*  
(1) Multiply  
 field goals three-point shots  
   
(2) Add   
   
Michael Jordan scored 33,454 points with the Bulls.



**31.** *Given*: Width of each picture and width of the matte frame  
*Find*: Space between each picture  
*Operations*  
(1) Multiply   
(2) Subtract 

(3) Divide    
There will be 2 in of matte between the pictures.

**32.** *Given*: Number of milliliters in the bottle and the dosage

**(a)** *Find*: Days the bottle will last  
*Operation*: Divide  
  
One bottle will last for 30 days.

**(b)** *Find*: Date to reorder  
*Operation*: Subtract  
  
The owner should order a refill no later than September 28.

**33.** *Given*: Number of male and female doctors

**(a)** *Find*: Difference between male and female doctors  
*Operation*: Subtract  
  
The difference between the number of male and female doctors is 424,400.

**(b)** *Find*: The total number of doctors  
*Operation*: Add  
  
The total number of doctors is 836,200.

**34.** *Given*: Scale on a map

**(a)** *Find*: Actual distance between Las Vegas and Salt Lake City  
*Operation*: Multiply  
  
The distance is 360 mi.



**(b)** *Find*: Distance on map between Madison and Dallas  
*Operation*: Divide  
  
14 in. represents 840 mi.



**35.** *Given*: Scale on a map

**(a)** *Find*: Actual distance between Wichita and Des Moines  
*Operation*: Multiply  
  
The distance is 320 mi.

**(b)** *Find*: The distance between Seattle and Sacramento on the map.  
*Operation*: Divide  
  
15 in. represents 600 mi.



**36.** *Given*: Number of books per box and number of books ordered  
*Find*: Number of boxes completely filled and number of books left over  
*Operation*: Divide and find remainder  
  
104 boxes will be filled completely with   
2 books left over.



**37.** *Given*: Number of eggs in a container and total number of eggs  
*Find*: Number of containers filled and number of eggs left over  
*Operation*: Divide and find remainder  
  
354 containers will be filled completely with 9 eggs left over.

**38.** *Given*: Total cost of dinner and type of bill used

**(a)** *Find*: Number of $20 bills needed  
*Operation*: Division  
  
Four $20 bills are not enough so Marc needs five $20 bills.



**(b)** *Find*: How much change  
*Operations*: Multiply and subtract  
   
He will receive $16 in change.



**39.** *Given*: total cost of CDs and type of bill used

**(a)** *Find*: How many $10 bills needed  
*Operation*: Divide  
  
Five $10 bills are not enough so Byron needs six $10 bills.



**(b)** *Find*: How much change  
*Operations*: Multiply and subtract  
   
He will receive $6 in change.



**40.** *Given*: Hourly wage and number of hours worked  
*Find*: Amount earned per week  
*Operations*  
(1) Multiply to find amount per job.  
 30 × 4 = 120  
 10 × 16 = 160  
 8 × 30 = 240  
 (2) Add to find total.  
   
 He earned $520.



**41.** *Given*: Hourly wage and number of hours worked  
*Find*: Total paid to all four workers  
*Operations*  
(1) Multiply to find amount per worker  
 36 × 18 = 648 26 × 24 = 624  
 28 × 15 = 420 22 × 48 = 1056  
 (2) Add to find total paid.  
   
The total amount paid was $2748.



**42.**



**43.** 

**44.** 

**45.** 

**46.**



**47.** 

**48.** 

**49.** 

**50.** 

**Chapter 1 Review Exercises**

Section 1.2

**1.** 10,024 Ten-thousands

**2.** 821,811 Hundred-thousands

**3.** 92,046

**4.** 503,160

**5.** 3 millions + 4 hundred-thousands   
 + 8 hundreds + 2 tens

**6.** 3 ten-thousands + 5 hundreds + 5 tens  
 + 4 ones

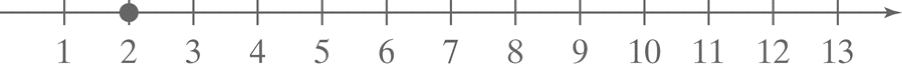
**7.** Two hundred forty-five

**8.** Thirty-thousand, eight hundred sixty-one

**9.** 3602

**10.** 800,039

**11.**



**12.**



**13.** 3 < 10 True

**14.** 10 > 12 False

Section 1.3

**15.** Addends: 105, 119; sum: 224

**16.** Addends: 53, 21; sum: 74

**17.**



**18.**



**19.**



**20.** 

**21. (a)** The order changed so it is the commutative property.

**(b)** The grouping changed so it is the associative property.

**(c)** The order changed so it is the commutative property.

**22.** minuend: 14  
subtrahend: 8  
difference: 6

**23.** minuend: 102  
subtrahend: 78  
difference: 24

**24.** 26 + 11 = 37



**25.** 20 + 41 = 61



**26.**



**27.**



**28.**



**29.**



**30.** 403 + 79 = 482



**31.** 44 + 92 = 136



**32.** 38 − 31 = 7

**33.** 111 − 15 = 96



**34.** 36 + 7 = 43

**35.** 23 + 6 = 29

**36.** 251 − 42 = 209



**37.** 90 − 52 = 38



**38. (a)** Add the numbers for AA Auto.  
 cars



**(b)** Add the numbers of Fords.  
 Fords



**39.** thousand seniors



**40.**  thousand people

**41.**  thousand people

**42.**  tons

**43.** 

**44.** m



Section 1.4

**45.** 5,234,446  
5,000,000

**46.** 9,332,945  
9,330,000

**47.** 

**48.**



**49.** 

17,000,000 people

**50.**



Section 1.5

**51.** Factors: 33, 40  
Product: 1320

**52. (a)** Yes

**(b)** Yes

**(c)** No

**53.** c

**54.** e

**55.** d

**56.** a

**57.** b

**58.**



**59.**



**60.**   
3,000,000



**61.** 



**62.** lb



Section 1.6

**63.** 42 ÷ 6 = 7  
divisor: 6, dividend: 42, quotient: 7

**64.**   
divisor: 4, dividend: 52, quotient: 13



**65.** 3 ÷ 1 = 3 because 1 × 3 = 3.

**66.** 3 ÷ 3 = 1 because 1 × 3 = 3.

**67.** 3 ÷ 0 is undefined.

**68.** 0 ÷ 3 = 0 because 0 × 3 = 0.

**69.** To check a division problem with no remainder you multiply the quotient by the divisor to get the dividend.

**70.** To check a division problem with a remainder you multiply the whole number part of the quotient by the divisor and add the remainder to get the dividend.

**71.**  ✓



**72.** ✓



**73.** ✓



**74.**



**75.**



**76.** Divide 105 by 4.  
  
26 photos with 1 left over



**77.** **(a)** Divide 60 by 15.  
60 ÷ 15 = 4 T-shirts

**(b)** Divide 60 by 12.  
60 ÷ 12 = 5 hats

Section 1.7

**78.**



**79.**



**80.**



**81.**



**82.**



**83.**



**84.** because 8 × 8 = 64.



**85.**  because 12 × 12 = 144.

**86.** 14 ÷ 7 ⋅ 4 − 1 = 2 ⋅ 4 − 1 = 8 − 1 = 7

**87. **

**88. **

**89.** 

**90.** 

**91.** 

**92.** 

**93.** 

**94.** 

**95.** 

**96.** 

Section 1.8

**97.** *Given*: The distance traveled and the number of trips

**(a)** *Find*: Number of miles traveled in one week  
*Operations*: Multiplication and addition  
 miles per week



**(b)** *Find*: Number of miles traveled in   
10 months with 4 weeks a month  
*Operation*: Multiplication  
 miles/month miles/year



**98.** *Given*: Contract: 252,000,000  
Time period: 9 years  
taxes: 75,600,000  
*Find*: Amount per year after taxes  
*Operations*  
(1) Subtract  
   
(2) Divide  
   
He received $19,600,000 per year.



**99.** *Given*: dimensions of a rectangular garden and size of division for plants

**(a)** *Find*: Number of plants  
*Operations*  
(1) Multiply  
 12 × 8 = 96  
 (2) Divide  
 96 ÷ 2 = 48  
She should purchase 48 plants.

**(b)** *Find*: Cost of plants for $3 each  
*Operation*: Multiply  
  
The plants will cost $144.



**(c)** *Find*: Perimeter of garden and cost of fence  
*Operations*  
(1) Add  
 12 + 8 + 12 + 8 = 40

(2) Multiply  
 40 × 2 = $80  
The fence costs $80.

**(d)** *Find*: Total cost of garden  
*Operations*: Add  
  
Aletha’s total cost will be $224.



**100.**



**101.**



**102.**



**Chapter 1 Test**

**1. (a)** 492 hundreds

**(b)** 23,441 thousands

**(c)** 2,340,711 millions

**(d)** 340,592 ten-thousands

**2. (a)** 4,065,000

**(b)** Twenty-one million, three hundred twenty-five thousand

**(c)** Twelve million, two hundred eighty-seven thousand

**(d)** 729,000

**(e)** Eleven million, four hundred ten thousand

**3. (a)** 14 > 6

**(b)** 72 < 81

**4.**



**5.**



**6.**



**7.**



**8.** 

**9.**



**10.**



**11.**



**12.**



**13.**



**14.**   
 1,500,000,000



**15.**



**16.** 403(0) = 0

**17.** is undefined.



**18.** **(a)** (11 ⋅ 6) ⋅ 3 = 11 ⋅ (6 ⋅ 3)  
The associative property of multiplication; the expression shows a change in grouping.

**(b)** (11 ⋅ 6) ⋅ 3 = 3 ⋅ (11 ⋅ 6)  
The commutative property of multiplication; the expression shows a change in the order of the factors.

**19. (a)** 4,850 → 4,900

**(b)** 12,493 → 12,000

**(c)** 7,963,126 → 8,000,000

**20.**   
There were approximately 1,430,000 people.



**21.**



**22.**



**23.**



**24. **

**25. **

**26. **

**27.** *Given*: Quiz scores and number of quizzes for Brittany and Jennifer  
*Find*: Who has the higher average  
*Operations*: Find the average of each group.  
Brittany:   
Jennifer:   
Jennifer has the higher average of 29. Brittany has an average of 28.



**28. (a)** Subtract to find the change from 2003 to 2004.  
thousand subscribers

**(b)** The largest increase was from 2004 to 2005.

**29.** Divide the number of calls by the number of weeks.  
North: 80 ÷ 16 = 5  
South: 72 ÷ 18 = 4  
East: 84 ÷ 28 = 3  
The North Side Fire Department is the busiest with 5 calls per week.

**30.** Add the sides.  
 mm



**31.** Add to find the perimeter.  
 ft  
Multiply to find the area.  




**32.**

