

1.2 - Applications of Linear Equations

1. Juan scored 10 points higher on his midterm and 29 points higher on his final than he did on his first exam. If his mean (average) score was 21, what was his score on the first exam?

- a. 7
- b. 15
- c. 8
- d. 6
- e. 10

ANSWER:

c

2. A college student earns \$15 per day delivering advertising brochures door-to-door, plus 25 cents for each person he interviews. How many people did he interview on a day when he earned \$45?

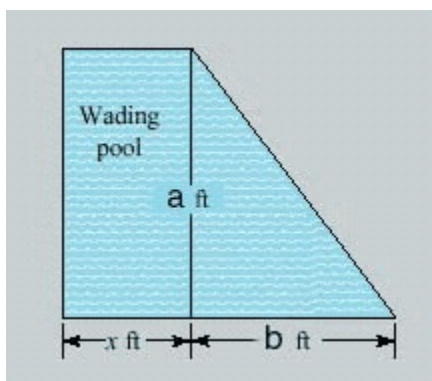
- a. 120
- b. 119
- c. 121
- d. 125
- e. 122

ANSWER:

a

3. The area of the triangular swimming pool shown in the illustration is doubled by adding a rectangular wading pool. Find the width of the pool (x).

(The area of a triangle = $\frac{1}{2}bh$, and the area of a rectangle = lw).



$$a = 23; b = 18$$

- a. 12 feet
- b. 21 feet
- c. 9 feet
- d. 8 feet
- e. 10 feet

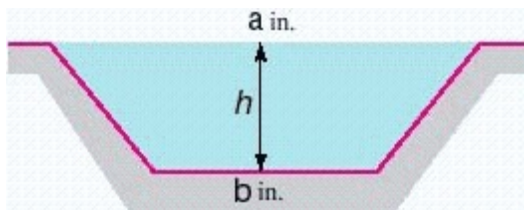
ANSWER:

c

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4. The trough in the illustration has a cross-sectional area of 75 square inches. Find the depth, h , of the trough.

(Area of a trapezoid = $\frac{1}{2}h(a+b)$)



$a = 10$; $b = 5$

- a. 14 inches
- b. 12 inches
- c. 10 inches
- d. 13 inches
- e. 18 inches

ANSWER:

c

5. An executive invests \$35,000, some at 10% and some at 8% annual interest. If he receives an annual return of \$3,180, how much is invested at each rate?

- a. \$19,000 at 8%, \$16,000 at 10%
- b. \$20,100 at 10%, \$14,900 at 8%
- c. \$19,000 at 10%, \$16,000 at 8%
- d. \$19,500 at 10%, \$15,500 at 8%
- e. \$20,000 at 10%, \$15,000 at 8%

ANSWER:

c

6. A full-price ticket for a college basketball game costs \$3.00, and a student ticket costs \$1.75. If 574 tickets were sold, and the total receipts were \$1,364.50, how many tickets were student tickets?

- a. 289 tickets
- b. 286 tickets
- c. 293 tickets
- d. 278 tickets
- e. 283 tickets

ANSWER:

b

7. Of the 549 tickets sold to a movie, 278 were full-price tickets costing \$5.00 each. If the gate receipts were \$2,541.75, what did a student ticket cost? Round your answer to the nearest cent.

- a. \$4.75
- b. \$5.25

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- c. \$3.75
- d. \$6.25
- e. \$4.25

ANSWER:

e

8. After being discounted 40%, a radio sells for \$67.20. Find the original price. Round your answer to the nearest cent.

- a. \$112.00
- b. \$114.00
- c. \$117.00
- d. \$104.00
- e. \$113.00

ANSWER:

a

9. A merchant increases the wholesale cost of a washing machine by 5% to determine the selling price. If the washer sells for \$394.80, find the wholesale cost. Round your answer to the nearest cent.

- a. \$390.00
- b. \$378.00
- c. \$369.00
- d. \$376.00
- e. \$384.00

ANSWER:

d

10. A computer store has fixed costs of \$14,525 per month and a unit cost of \$780 for every computer it sells. If the store can sell all the computers it can get for \$1,195 each, how many must be sold for the store to break even? (The break-even point occurs when costs equal income.)

- a. 37 computers
- b. 49 computers
- c. 28 computers
- d. 35 computers
- e. 43 computers

ANSWER:

d

11. An empty swimming pool can be filled in 12 hours. When full, the pool can be drained in 24 hours. How long will it take to fill the empty pool if the drain is left open?

- a. 31 hours
- b. 25 hours
- c. 24 hours
- d. 26 hours
- e. 23 hours

ANSWER:

c

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12. The nurse has 4.8 liter(s) of a solution that is 21.6% alcohol. How many liters of pure alcohol must she add to bring the solution up to a 70.6% concentration?

- a. 7.8 liters
- b. 8 liters
- c. 8.4 liters
- d. 8.11 liters
- e. 8.8 liters

ANSWER:

b

13. A swimming pool contains 19,000 gallons of water. How many gallons of chlorine must be added to "shock the pool" and bring the water to a $\frac{35}{100}$ % solution? Round your answer to two decimal places.

- a. 66.23 gallons
- b. 66.84 gallons
- c. 67.53 gallons
- d. 66.73 gallons
- e. 67.13 gallons

ANSWER:

d

14. Two cars leave Pima Community College traveling in opposite directions. One car travels at 81 mph and the other at 52 mph. In how many hours will they be 399 miles apart?

- a. 3 hours
- b. 10 hours
- c. 2 hours
- d. 8 hours
- e. 6 hours

ANSWER:

a

15. Some bank robbers leave town, speeding at 70 mph. 30 minutes later, the police give chase, traveling at 80 mph. How long will it take the police to overtake the robbers? (Please calculate the time in hours.)

- a. 3 hour(s)
- b. 3.5 hour(s)
- c. 4.5 hours
- d. 6.5 hours
- e. 4 hours

ANSWER:

b

16. One morning, John drove 6 hours before stopping to eat. After lunch, he increased his speed by 10 mph. If he completed a 390-mile trip in 9 hours of driving time, how fast did he drive in the morning?

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- a. 36 mph
- b. 40 mph
- c. 48 mph
- d. 33 mph
- e. 43 mph

ANSWER: b

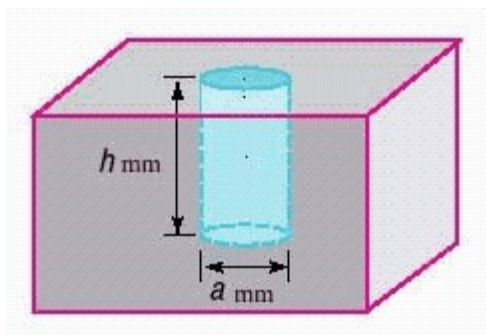
17. A plane can fly 510 mph in still air. If it can fly 540 miles downwind in the same amount of time it can fly 480 miles upwind, find the velocity of the wind.

- a. 60 mph
- b. 30 mph
- c. 40 mph
- d. 45 mph
- e. 53 mph

ANSWER: b

18. 53.41 cubic millimeters of material was removed by drilling the blind hole shown in the illustration. Find the depth of the hole.

(The volume of a cylinder is given by $V = \pi r^2 h$)



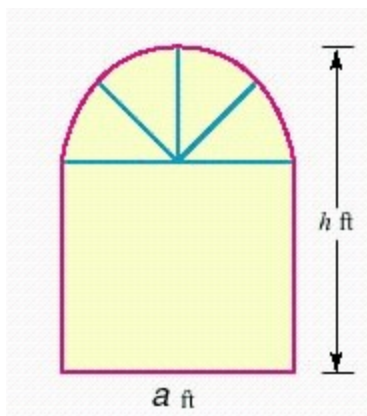
$a = 2$

- a. 19 millimeters
- b. 14 millimeters
- c. 10 millimeters
- d. 17 millimeters
- e. 25 millimeters

ANSWER: d

19. The Norman window with dimensions as shown in the illustration is a rectangle topped by a semicircle. If the area of the window is 50.14 square feet, find its height h .

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$a = 6$

- a. 8 feet
- b. 9 feet
- c. 7 feet
- d. 13 feet
- e. 12 feet

ANSWER:

b

20. Candy and Tim share a paper route. It takes Candy 45 minutes to deliver all the papers, whereas Tim takes 90 minutes. How long does it take them when they work together? Round your answer to the nearest tenth, if necessary.

- a. 45 minutes
- b. 22.5 minutes
- c. 67.5 minutes
- d. 30 minutes
- e. none of these

ANSWER:

d

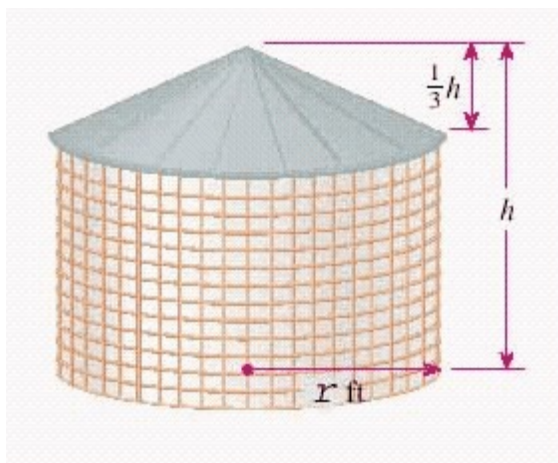
21. A storage bin for corn consists of a cylindrical section made of wire mesh, surmounted by a conical tin roof, as shown in the figure. The height of the roof is one-third the entire height of the structure. If the total volume of the structure is 1,400 feet³ and its radius is $r = 10$ feet, what is its height? Round your answer to the nearest tenth.

Hint: use the formulas for the volume of the solid.

Volume of cone = $\frac{1}{3} \pi R^2 h$

Volume of cylinder = $\pi R^2 h$

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- a. 14.0 feet
- b. 18.0 feet
- c. 20.0 feet
- d. 5.7 feet
- e. none of these

ANSWER:

d

22. Jake can wash a car in 35 minutes, while Harold can wash the same car in 40 minutes. How long will it take them to wash the car if they work together?

- a. 35 minutes
- b. $\frac{3}{56}$ minutes
- c. 5 minutes
- d. 30 minutes
- e. $\frac{56}{3}$ minutes

ANSWER:

e

23. Juan scored 7 points higher on his midterm and 20 points higher on his final than he did on his first exam. If his mean (average) score was 39, what was his score on the first exam?

Please enter your answer as a number without the units.

ANSWER:

30

24. A college student earns \$50 per day delivering advertising brochures door-to-door, plus 50 cents for each person he interviews. How many people did he interview on a day when he earned \$126?

Please enter your answer as a number without the units.

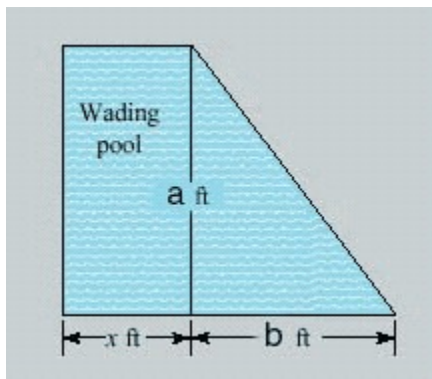
ANSWER:

152

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25. The area of the triangular swimming pool shown in the illustration is doubled by adding a rectangular wading pool. Find the width of the pool (x).

(The area of a triangle = $\frac{1}{2}bh$, and the area of a rectangle = lw).



$$a = 27; b = 20$$

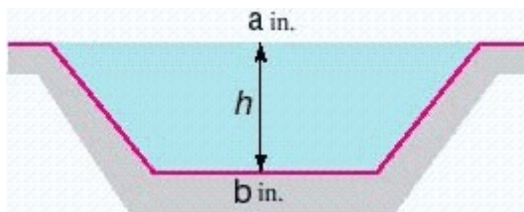
Please enter your answer as a number without the units.

ANSWER:

10

26. The trough in the illustration has a cross-sectional area of 115 square inches. Find the depth, h , of the trough.

(Area of a trapezoid = $\frac{1}{2}h(a+b)$)



$$a = 14; b = 9$$

Enter your answer as a number without the units.

ANSWER:

10

27. A full-price ticket for a college basketball game costs \$5, and a student ticket costs \$3.00. If 460 tickets were sold, and the total receipts were \$1,626.00, how many tickets were student tickets?

Please enter your answer as a number without the units.

ANSWER:

337

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28. Of the 669 tickets sold to a movie, 395 were full-price tickets costing \$5.00 each. If the gate receipts were \$3,208.00, what did a student ticket cost?

Please enter your answer in dollars and cents. Enter your answer without the units.

ANSWER: 4.50

29. On the Illinois certification test for teachers specializing in learning disabilities, a teacher earned the scores shown in the accompanying table. What was the teacher's score in program development?

Human development with special needs	84
Assessment	90
Program development and instruction	?
Professional knowledge and legal issues	83
AVERAGE SCORE	87

- a. 91
- b. 90
- c. 92
- d. 89

ANSWER: a

30. The cost per night to stay in a three-bedroom beachfront condo in Myrtle Beach, SC, is \$295. This includes a 18% tax. What is the nightly cost?

- a. \$268
- b. \$45
- c. \$250
- d. \$277

ANSWER: c