7th Grade Advanced 2

1 Cumulative Assessment

Test-Taking Strategy

Solve Directly or Eliminate Choices

"You can eliminate A and D. Then, solve directly to determine that the correct answer is B."

1. Which value of x makes the equation true?

$$4x = 32$$

A. 8 **C.** 36

B. 28 **D.** 128

2. A taxi ride costs \$3 plus \$2 for each mile driven. When you rode in a taxi, the total cost was \$39. This can be modeled by the equation below, where m represents the number of miles driven.

$$2m + 3 = 39$$

How long was your taxi ride?

F. 72 mi **H.** 21 mi

G. 34 mi **I.** 18 mi

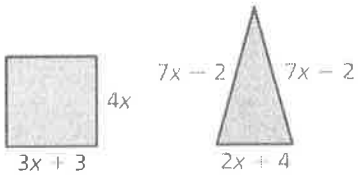
3. Which of the following equations has exactly one solution?

A. $\frac{2}{3}(x + 6) = \frac{2}{3}x + 4$ **C.** $\frac{4}{5}\left(n + \frac{1}{3}\right) = \frac{4}{5}n + \frac{1}{3}$

B. $\frac{3}{7}y + 13 = 13 - \frac{3}{7}y$ **D.** $\frac{7}{8}\left(2t + \frac{1}{8}\right) = \frac{7}{4}t$

A

The perimeter of the square is equal to the perimeter of the triangle. What are the side lengths of the square?



4. The formula below relates distance, rate, and time.

$$d = rt$$

Solve this formula for t.

F. $t = dr$ **H.** $t = d - r$

G. $t = \frac{d}{r}$ **I.** $t = \frac{r}{d}$

5. What could be the first step to solve the equation shown below?

$$3x + 5 = 2(x + 7)$$

A. Combine $3x$ and 5.

B. Multiply x by 2 and 7 by 2.

C. Subtract x from $3x$.

D. Subtract 5 from 7.

B

Think Solve Explain

You work as a sales representative. You earn $400 per week plus 5% of your total sales for the week.

Part A Last week, you had total sales of $5000. Find your total earnings. Show your work.

Part B One week, you earned $1350. Let s represent your total sales that week. Write an equation that you could use to find s.

Part C Using your equation from Part B, find s. Show all steps clearly.

6. In 10 years, Maria will be 39 years old. Let m represent Maria's age today. Which equation can you use to find m?

F. $m = 39 + 10$

G. $m - 10 = 39$

H. $m + 10 = 39$

I. $10m = 39$

7. Which value of y makes the equation below true?

$$3y + 8 = 7y + 11$$

A. -4.75

B. -0.75

C. 0.75

D. 4.75

8. The equation below is used to convert a Fahrenheit temperature F to its equivalent Celsius temperature C.

$$C = \frac{5}{9}(F - 32)$$

Which formula can be used to convert a Celsius temperature to its equivalent Fahrenheit temperature?

F. $F = \frac{5}{9}(C - 32)$

G. $F = \frac{9}{5}(C + 32)$

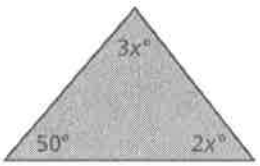
H. $F = \frac{9}{5}C + \frac{32}{5}$

I. $F = \frac{9}{5}C + 32$

C

You have already saved $35 for a new cell phone. You need $175 in all. You think you can save $10 per week. At this rate, how many more weeks will you need to save money before you can buy the new cell phone?

9. What is the greatest angle measure in the triangle below?



Sum of angle measures: 180°

A. 26°

B. 78°

C. 108°

D. 138°

10. Which value of x makes the equation below true?

$$6(x - 3) = 4x - 7$$

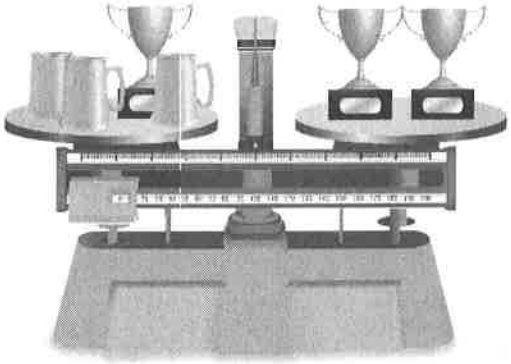
F. −5.5

G. −2

H. 1.1

I. 5.5

11. The drawing below shows equal weights on two sides of a balance scale.



What can you conclude from the drawing?

A. A mug weighs one-third as much as a trophy.

B. A mug weighs one-half as much as a trophy.

C. A mug weighs twice as much as a trophy.

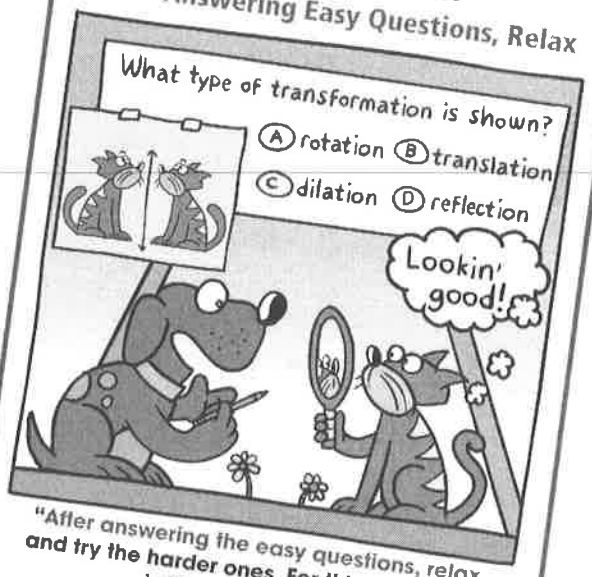
D. A mug weighs three times as much as a trophy.

2 Cumulative Assessment

D. A clockwise rotation of 90° is equivalent to a counterclockwise rotation of how many degrees?

Test-Taking Strategy

After Answering Easy Questions, Relax



"After answering the easy questions, relax and try the harder ones. For this, the image is flipped. So, it's D."

12. The formula $K = C + 273.15$ converts temperatures from Celsius C to Kelvin K. Which of the following formulas is *not* correct?

A. $K - C = 273.15$

B. $C = K - 273.15$

C. $C - K = -273.15$

D. $C = K + 273.15$

13. Joe wants to solve the equation $-3(x + 2) = 12x$. What should he do first?

F. Subtract 2 from each side.

G. Add 3 to each side.

H. Multiply each side by -3.

I. Divide each side by -3.

14. Which transformation *turns* a figure?

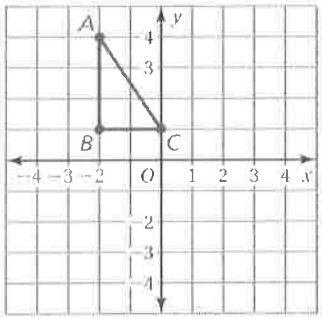
A. translation

B. reflection

C. rotation

D. dilation

15. A triangle is graphed in the coordinate plane below.



Translate the triangle 3 units right and 2 units down. What are the coordinates of the image?

F. $A'(1, 4), B'(1, 1), C'(3, 1)$

G. $A'(1, 2), B'(1, -1), C'(3, -1)$

H. $A'(-2, 2), B'(-2, -1), C'(0, -1)$

I. $A'(0, 1), B'(0, -2), C'(2, -2)$

16. Dale solved the equation in the box shown. What should Dale do to correct the error that he made?

$$-\frac{x}{3} + \frac{2}{5} = -\frac{7}{15}$$
$$-\frac{x}{3} + \frac{2}{5} - \frac{2}{5} = -\frac{7}{15} - \frac{2}{5}$$
$$-\frac{x}{3} = -\frac{13}{15}$$
$$3 \cdot \left(-\frac{x}{3}\right) = 3 \cdot \left(-\frac{13}{15}\right)$$
$$x = -2\frac{3}{5}$$

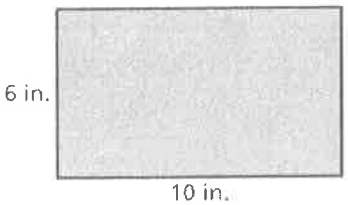
A. Add $\frac{2}{5}$ to each side to get $-\frac{x}{3} = -\frac{1}{15}$.

B. Multiply each side by -3 to get $x + \frac{2}{5} = \frac{7}{5}$.

C. Multiply each side by -3 to get $x = 2\frac{3}{5}$.

D. Subtract $\frac{2}{5}$ from each side to get $-\frac{x}{3} = -\frac{5}{10}$.

E Jenny dilates the rectangle below using a scale factor of $\frac{1}{2}$.



What is the area of the dilated rectangle in square inches?

17. The vertices of a rectangle are $A(-4, 2)$, $B(3, 2)$, $C(3, -5)$, and $D(-4, -5)$. If the rectangle is dilated by a scale factor of 3, what will be the coordinates of vertex C'?

F. $(9, -15)$

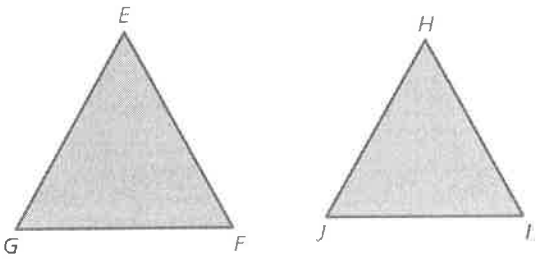
G. $(-12, 6)$

H. $(-12, -15)$

I. $(9, 6)$

18. In the figures, Triangle *EFG* is a dilation of Triangle *HIJ*.

Which proportion is *not* necessarily correct for Triangle *EFG* and Triangle *HIJ*?



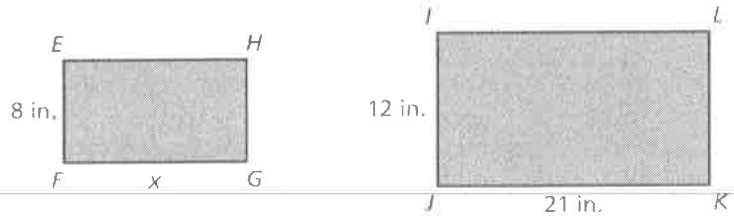
A. $\frac{EF}{FG} = \frac{HI}{IJ}$

B. $\frac{EG}{HI} = \frac{FG}{IJ}$

C. $\frac{GE}{EF} = \frac{JH}{HI}$

D. $\frac{EF}{HI} = \frac{GE}{JH}$

19. In the figures below, Rectangle *EFGH* is a dilation of Rectangle *IJKL*.



What is x?

F. 14 in.

G. 15 in.

H. 16 in.

I. 17 in.

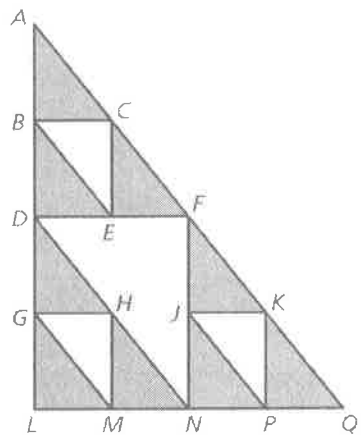
F. Several transformations are used to create the pattern.

Think Solve Explain

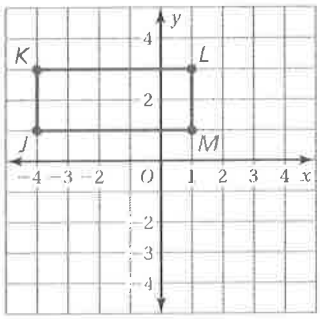
Part A Describe the transformation of Triangle *GLM* to Triangle *DGH*.

Part B Describe the transformation of Triangle *ALQ* to Triangle *GLM*.

Part C Triangle *DFN* is a dilation of Triangle *GHM*. Find the scale factor.



20. A rectangle is graphed in the coordinate plane below.



Rotate the rectangle 180° about the origin. What are the coordinates of the image?

A. $J'(4, -1)$, $K'(4, -3)$, $L'(-1, -3)$, $M'(-1, -1)$

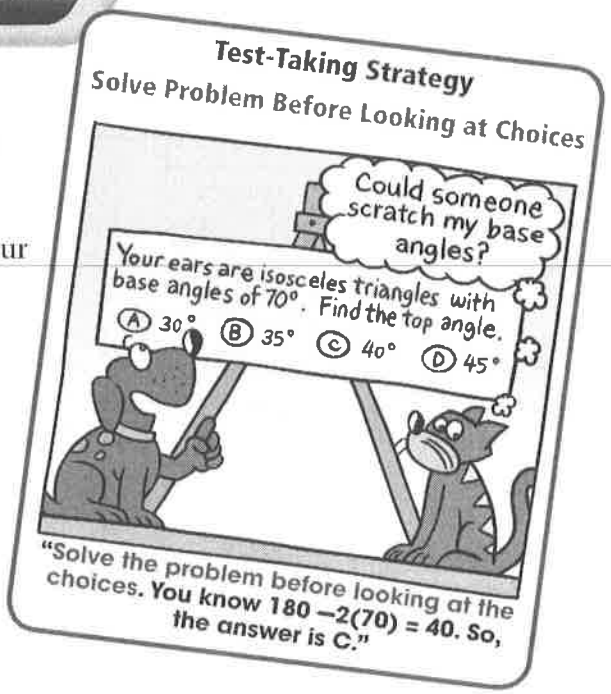
B. $J'(-4, -1)$, $K'(-4, -3)$, $L'(1, -3)$, $M'(1, -1)$

C. $J'(1, 4)$, $K'(3, 4)$, $L'(3, -1)$, $M'(1, -1)$

D. $J'(-4, 1)$, $K'(-4, 3)$, $L'(1, 3)$, $M'(1, 1)$

3 Cumulative Assessment

G The border of a Canadian one-dollar coin is shaped like an 11-sided regular polygon. The shape was chosen to help visually impaired people identify the coin. How many degrees are in each angle along the border? Round your answer to the nearest degree.



21. A public utility charges its residential customers for natural gas based on the number of therms used each month. The formula below shows how the monthly cost C in dollars is related to the number t of therms used.

$$C = 11 + 1.6t$$

Solve this formula for t.

A. $t = \frac{C}{12.6}$

B. $t = \frac{C - 11}{1.6}$

C. $t = \frac{C}{1.6} - 11$

D. $t = C - 12.6$

22. What is the value of x?

$$5(x - 4) = 3x$$

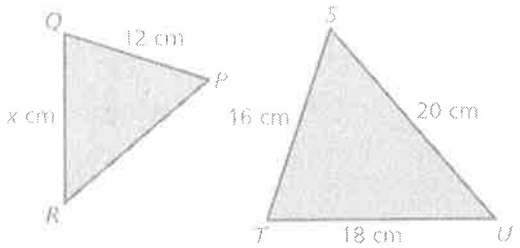
F. -10

G. 2

H. $2\frac{1}{2}$

I. 10

23. In the figures below, $\triangle PQR$ is a dilation of $\triangle STU$.



What is the value of x?

A. 9.6

B. $10\frac{2}{3}$

C. 13.5

D. 15

H. What is the value of x?

24. Olga was solving an equation in the box shown.

$$-\frac{2}{5}(10x - 15) = -30$$
$$10x - 15 = -30\left(-\frac{2}{5}\right)$$
$$10x - 15 = 12$$
$$10x - 15 + 15 = 12 + 15$$
$$10x = 27$$
$$\frac{10x}{10} = \frac{27}{10}$$
$$x = \frac{27}{10}$$

What should Olga do to correct the error that she made?

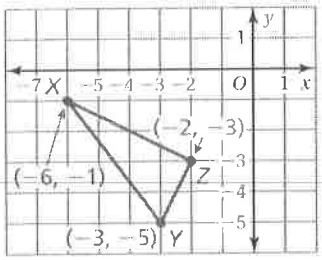
F. Multiply both sides by $-\frac{5}{2}$ instead of $-\frac{2}{5}$.

G. Multiply both sides by $\frac{2}{5}$ instead of $-\frac{2}{5}$.

H. Distribute $-\frac{2}{5}$ to get $-4x - 6$.

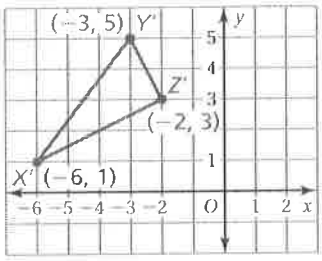
I. Add 15 to -30.

25. In the coordinate plane below, $\triangle XYZ$ is plotted and its vertices are labeled.

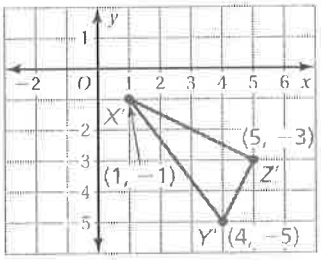


Which of the following shows $\triangle X'Y'Z'$, the image of $\triangle XYZ$ after it is reflected in the y-axis?

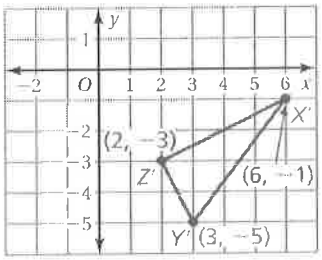
A.



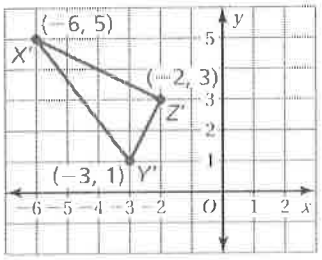
C.



B.



D.



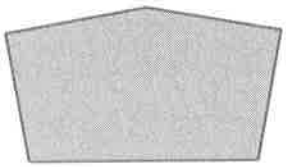
I. The sum S of the interior angle measures of a polygon with n sides can be found by using a formula.

Think Solve Explain

Part A Write the formula.

Part B A quadrilateral has angles measuring 100°, 90°, and 90°. Find the measure of its fourth angle. Show your work and explain your reasoning.

Part C The sum of the measures of the angles of the pentagon shown is 540°. Divide the pentagon into triangles to show why this must be true. Show your work and explain your reasoning.



4 Cumulative Assessment

Test-Taking Strategy

Estimate the Answer

"Using estimation, you can see that there are about 300 hairs. So, it has to be C."

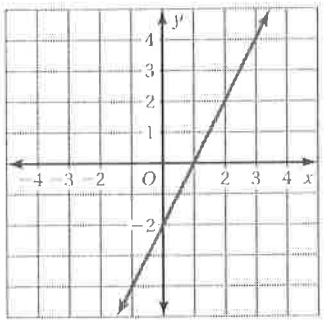
26. Which equation matches the line shown in the graph?

A. $y = 2x - 2$

B. $y = 2x + 1$

C. $y = x - 2$

D. $y = x + 1$



27. The equation $6x - 5y = 14$ is written in standard form. Which point lies on the graph of this equation?

F. $(-4, -1)$

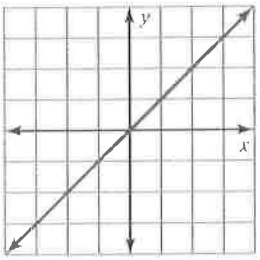
G. $(-2, 4)$

H. $(-1, -4)$

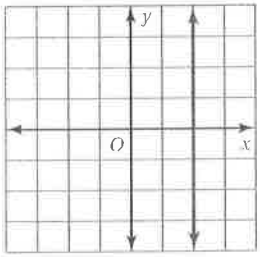
I. $(4, -2)$

28. Which line has a slope of 0?

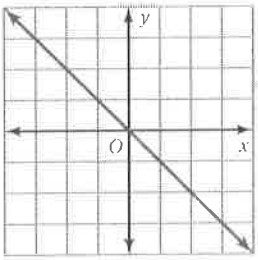
A.



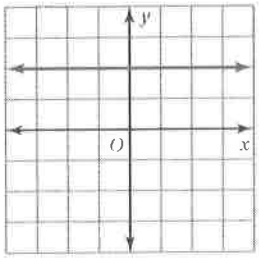
B.



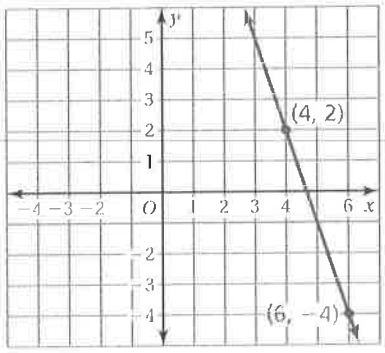
C.



D.



29. Which of the following is the equation of a line perpendicular to the line shown in the graph?



F. $y = 3x - 10$

G. $y = \frac{1}{3}x + 12$

H. $y = -3x + 5$

I. $y = -\frac{1}{3}x - 18$

J. What is the slope of the line that passes through the points (2, −2) and (8, 1)?

36. A cell phone plan costs \$10 per month plus \$0.10 for each minute used. Last month, you spent \$18.50 using this plan. This can be modeled by the equation below, where m represents the number of minutes used.

$$0.1m + 10 = 18.5$$

How many minutes did you use last month?

A. 8.4 min

B. 85 min

C. 185 min

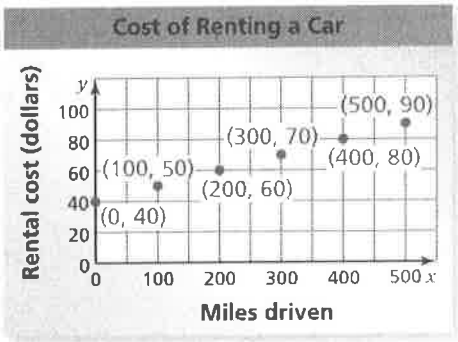
D. 285 min

K. It costs \$40 to rent a car for one day. In addition, the rental agency charges you for each mile driven, as shown in the graph.

Think Solve Explain

Part A Determine the slope of the line joining the points on the graph.

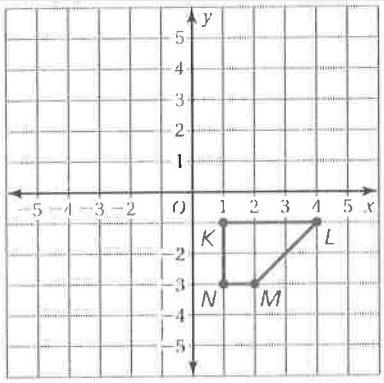
Part B Explain what the slope represents.



L. What value of x makes the equation below true?

$$7 + 2x = 4x - 5$$

31. Trapezoid *KLMN* is graphed in the coordinate plane shown.



Rotate Trapezoid *KLMN* 90° clockwise about the origin. What are the coordinates of point M', the image of point M after the rotation?

F. $(-3, -2)$

G. $(-2, -3)$

H. $(-2, 3)$

I. $(3, 2)$

32. Solve the formula $K = 3M - 7$ for M.

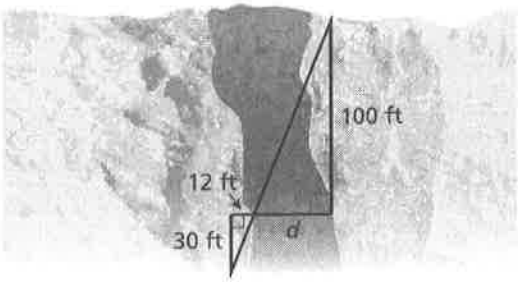
A. $M = K + 7$

B. $M = \frac{K+7}{3}$

C. $M = \frac{K}{3} + 7$

D. $M = \frac{K-7}{3}$

33. What is the distance d across the canyon?



F. 3.6 ft

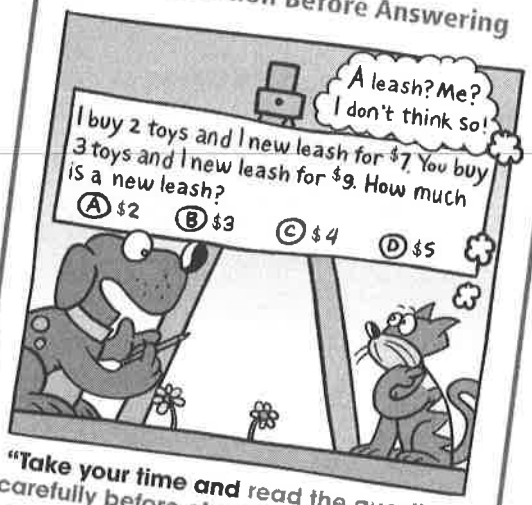
G. 12 ft

H. 40 ft

I. 250 ft

5 Cumulative Assessment

Test-Taking Strategy
Read Question Before Answering



"Take your time and read the question carefully before choosing your answer."

34. What is the solution of the system of equations shown below?

$$y = -\frac{2}{3}x - 1$$

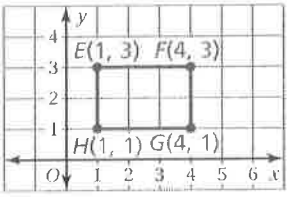
$$4x + 6y = -6$$

A. $\left(-\frac{3}{2}, 0\right)$ **C.** no solution

B. $(0, -1)$ **D.** infinitely many solutions

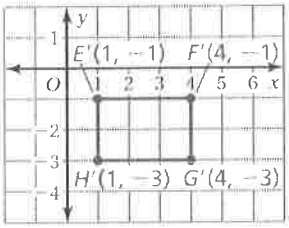
M What is the slope of a line that is perpendicular to the line $y = -0.25x + 3$?

35. On the grid below, Rectangle *EFGH* is plotted and its vertices are labeled.

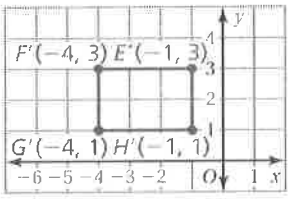


Which of the following shows Rectangle $E'F'G'H'$, the image of Rectangle *EFGH* after it is reflected in the x-axis?

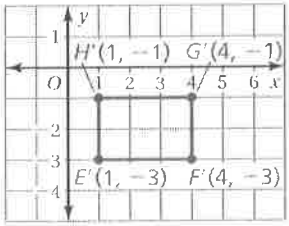
F.



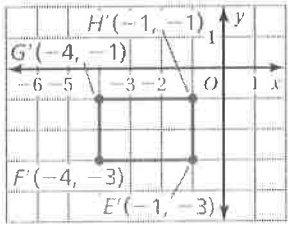
H.



G.



I.



36. Which point is a solution of the system of equations shown below?

$$x + 3y = 10$$
$$x = 2y - 5$$

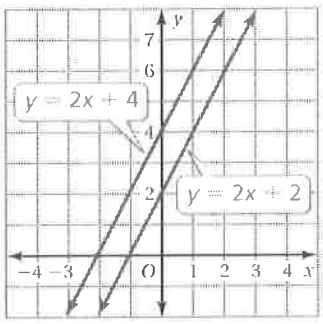
A. (1, 3)

B. (3, 1)

C. (55, −15)

D. (−35, −15)

37. The graph of a system of two linear equations is shown. How many solutions does the system have?



F. none

G. exactly one

H. exactly two

I. infinitely many

38. A scenic train ride has one price for adults and one price for children. One family of two adults and two children pays $62 for the train ride. Another family of one adult and four children pays $70. Which system of linear equations can you use to find the price x for an adult and the price y for a child?

A. $2x + 2y = 70$
$x + 4y = 62$

B. $x + y = 62$
$x + y = 70$

C. $2x + 2y = 62$
$4x + y = 70$

D. $2x + 2y = 62$
$x + 4y = 70$

39. Which of the following is true about the graph of the linear equation $y = -7x + 5$?

F. The slope is 5, and the y-intercept is −7.

G. The slope is −5, and the y-intercept is −7.

H. The slope is −7, and the y-intercept is −5.

I. The slope is −7, and the y-intercept is 5.

N What value of w makes the equation below true?

$$7w - 3w = 2(3w + 11)$$

40. The graph of which equation is parallel to the line that passes through the points $(-1, 5)$ and $(4, 7)$?

A. $y = \frac{2}{3}x + 6$

B. $y = -\frac{5}{2}x + 4$

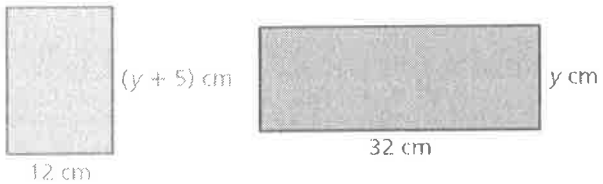
C. $y = \frac{2}{5}x + 1$

D. $y = \frac{5}{2}x - 1$

0. You buy 3 T-shirts and 2 pairs of shorts for \$42.50. Your friend buys 5 T-shirts and 3 pairs of shorts for \$67.50. Use a system of linear equations to find the cost of each T-shirt. Show your work and explain your reasoning.

Think
Solve
Explain

41. The two figures have the same area. What is the value of y?



F. $\frac{1}{4}$

G. $\frac{15}{8}$

H. 3

I. 8

42. A system of two linear equations has infinitely many solutions. What can you conclude about the graphs of the two equations?

A. The lines have the same slope and the same y-intercept.

B. The lines have the same slope and different y-intercepts.

C. The lines have different slopes and the same y-intercept.

D. The lines have different slopes and different y-intercepts.

43. The sum of one-third of a number and 10 is equal to 13. What is the number?

F. $\frac{8}{3}$

G. 9

H. 29

I. 69

44. Solve the equation $4x + 7y = 16$ for x.

A. $x = 4 + \frac{7}{4}y$

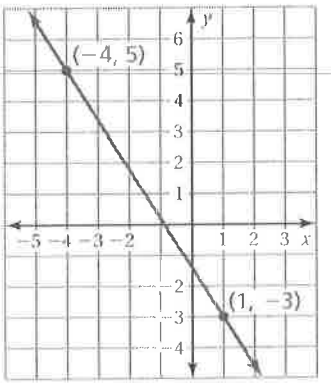
B. $x = 4 - \frac{7}{4}y$

C. $x = 4 + \frac{4}{7}y$

D. $x = 16 - 7y$

6 Cumulative Assessment

45. What is the slope of the line shown in the graph below?



A. $-\frac{8}{3}$

B. $-\frac{8}{5}$

C. $-\frac{2}{3}$

D. $-\frac{2}{5}$

Test-Taking Strategy

Work Backwards

For x cats, a litter box is changed $y = 3x$ times per month. How many cats are there when $y = 12$?

Ⓐ 1 Ⓑ 2 Ⓒ 3 Ⓓ 4

"Work backwards by trying 1, 2, 3, and 4. You will see that 3(4) = 12. So, D is correct."

46. Which value of a makes the equation below true?

$$24 = \frac{a}{3} - 9$$

F. 5

G. 11

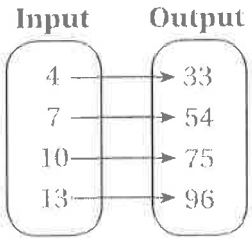
H. 45

I. 99

P A mapping diagram is shown.

What number belongs in the box below so that the equation will correctly describe the function represented by the mapping diagram?

$$y = \square x + 5$$



47. What is the solution of the system of linear equations shown below?

$$y = 2x - 1$$
$$y = 3x + 5$$

A. $(-13, -6)$

B. $(-6, -13)$

C. $(-13, 6)$

D. $(-6, 13)$

48. A system of two linear equations has no solution. What can you conclude about the graphs of the two equations?

F. The lines have the same slope and the same y-intercept.

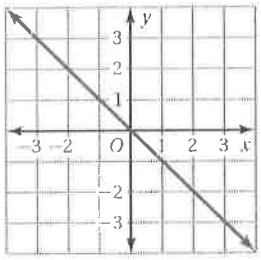
G. The lines have the same slope and different y-intercepts.

H. The lines have different slopes and the same y-intercept.

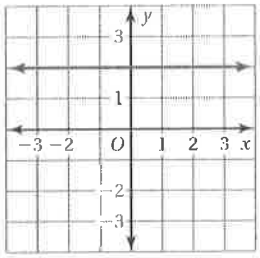
I. The lines have different slopes and different y-intercepts.

49. Which graph shows a nonlinear function?

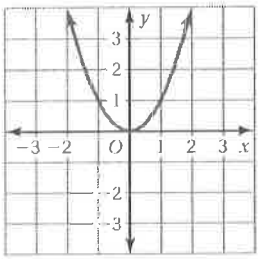
A.



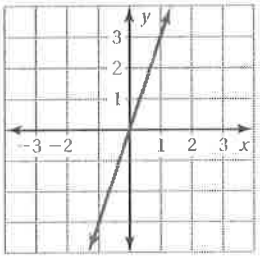
C.



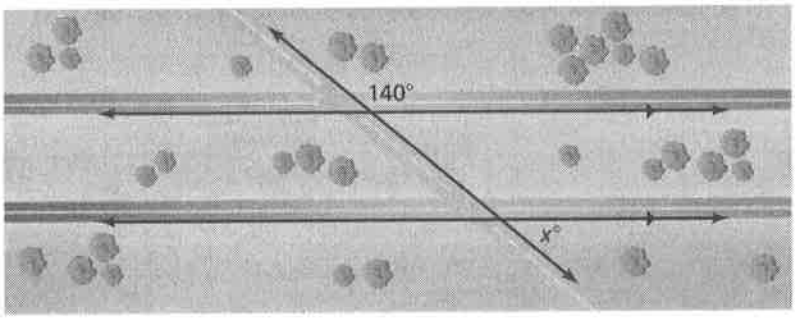
B.



D.



50. What is the value of x?



F. 40

G. 50

H. 140

I. 220

Q. The tables show the sales (in millions of dollars) for two companies over a 5-year period. Examine the data in the tables.

Think
Solve
Explain

Year	1	2	3	4	5
Sales	2	4	6	8	10

Year	1	2	3	4	5
Sales	1	1	2	3	5

Part A Does the first table show a linear function? Explain your reasoning.

Part B Does the second table show a linear function? Explain your reasoning.

57. The equations $y = -x + 4$ and $y = \frac{1}{2}x - 8$ form a system of linear equations. The table below shows the y-value for each equation at six different values of x.

x	0	2	4	6	8	10
$y = -x + 4$	4	2	0	−2	−4	−6
$y = \frac{1}{2}x - 8$	−8	−7	−6	−5	−4	−3

What can you conclude from the table?

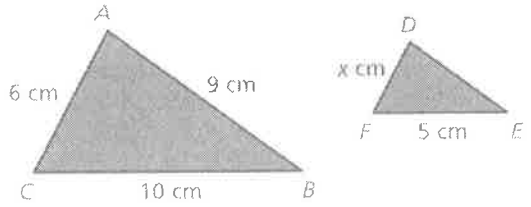
A. The system has one solution, when $x = 0$.

B. The system has one solution, when $x = 4$.

C. The system has one solution, when $x = 8$.

D. The system has no solution.

K. In the diagram below, Triangle *ABC* is a dilation of Triangle *DEF*. What is the value of x?



7 Cumulative Assessment

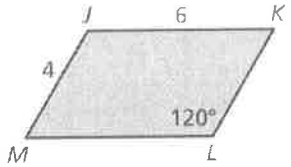
Test-Taking Strategy
Answer Easy Questions First

"Scan the test and answer the easy questions first. You know the square root of 4 is 2."

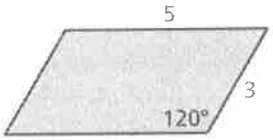
52. The period T of a pendulum is the time, in seconds, it takes the pendulum to swing back and forth. The period can be found using the formula $T = 1.1\sqrt{L}$, where L is the length, in feet, of the pendulum. A pendulum has a length of 4 feet. Find its period.

A. 5.1 sec
B. 4.4 sec
C. 3.1 sec
D. 2.2 sec

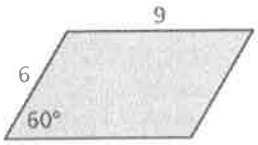
53. Which parallelogram is a dilation of parallelogram $JKLM$? (Figures not drawn to scale.)



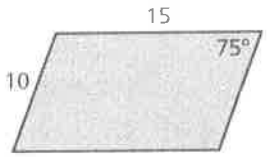
F.



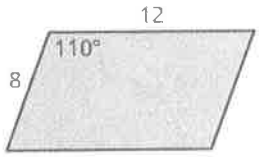
H.



G.



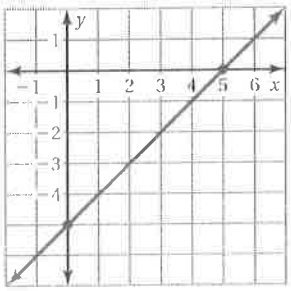
I.



54. Which equation represents a linear function?

A. $y = x^2$
B. $y = \frac{2}{x}$
C. $xy = 1$
D. $x + y = 1$

55. Which linear function matches the line shown in the graph?



F. $y = x - 5$
G. $y = x + 5$
H. $y = -x - 5$
I. $y = -x + 5$

S. A football field is 40 yards wide and 120 yards long. Find the distance between opposite corners of the football field. Show your work and explain your reasoning.

Think
Solve
Explain

T. A computer consultant charges \$50 plus \$40 for each hour she works. The consultant charged \$650 for one job. This can be represented by the equation below, where h represents the number of hours worked.

$$40h + 50 = 650$$

How many hours did the consultant work?

56. You can use the formula below to find the sum S of the interior angle measures of a polygon with n sides. Solve the formula for n.

$$S = 180(n - 2)$$

A. $n = 180(S - 2)$

B. $n = \frac{S}{180} + 2$

C. $n = \frac{S}{180} - 2$

D. $n = \frac{S}{180} + \frac{1}{90}$

57. The table below shows a linear pattern. Which linear function relates y to x?

x	1	2	3	4	5
y	4	2	0	−2	−4

F. $y = 2x + 2$

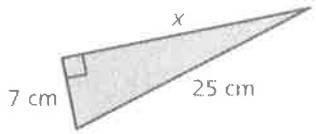
G. $y = 4x$

H. $y = -2x + 2$

I. $y = -2x + 6$

U. An airplane flies from City 1 at (0, 0) to City 2 at (33, 56) and then to City 3 at (23, 32). What is the total number of miles it flies? Each unit of the coordinate grid represents 1 mile.

58. What is the missing length of the right triangle shown?



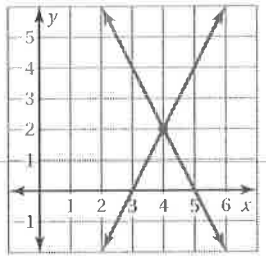
A. 16 cm

B. 18 cm

C. 24 cm

D. $\sqrt{674}$ cm

59. A system of linear equations is shown in the coordinate plane below. What is the solution for this system?



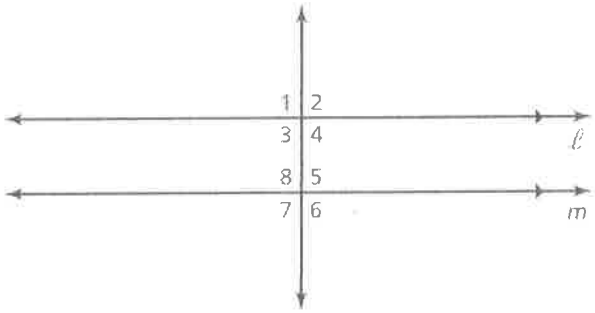
F. (0, 10)

G. (3, 0)

H. (4, 2)

I. (5, 0)

60. In the diagram, lines ℓ and m are parallel. Which angle has the same measure as $\angle 1$?



A. $\angle 2$

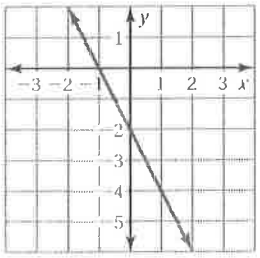
B. $\angle 5$

C. $\angle 7$

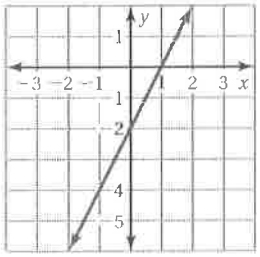
D. $\angle 8$

61. Which graph represents the linear equation $y = -2x - 2$?

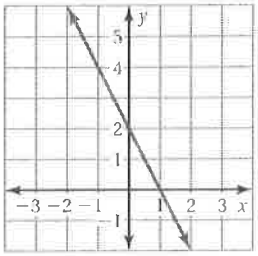
F.



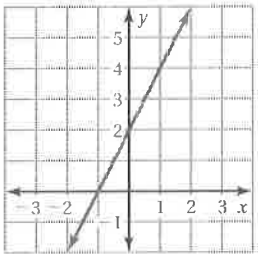
G.



H.



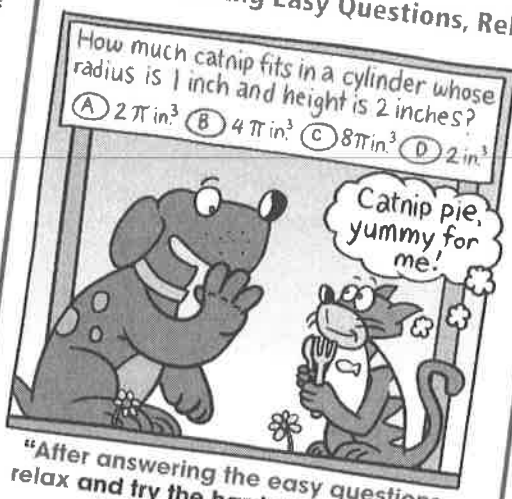
I.



8 Cumulative Assessment

Test-Taking Strategy

After Answering Easy Questions, Relax



"After answering the easy questions, relax and try the harder ones. For this, $\pi r^2 h = 2\pi$. So, it's A."

62. What value of w makes the equation below true?

$$\frac{w}{3} = 3(w - 1) - 1$$

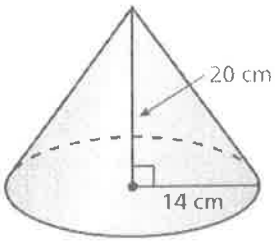
A. $\frac{1}{2}$

B. $\frac{3}{4}$

C. $\frac{5}{4}$

D. $\frac{3}{2}$

63. A right circular cone and its dimensions are shown below.



What is the volume of the right circular cone? $\left(\text{Use } \frac{22}{7} \text{ for } \pi.\right)$

F. $1{,}026\frac{2}{3}$ cm^3

G. 3,080 cm^3

H. $4{,}106\frac{2}{3}$ cm^3

I. 12,320 cm^3

64. Patricia solved the equation in the box shown.

What should Patricia do to correct the error that she made?

$$-\frac{3}{2}(8x - 10) = -20$$
$$8x - 10 = -20\left(-\frac{3}{2}\right)$$
$$8x - 10 = 30$$
$$8x - 10 + 10 = 30 + 10$$
$$8x = 40$$
$$\frac{8x}{8} = \frac{40}{8}$$
$$x = 5$$

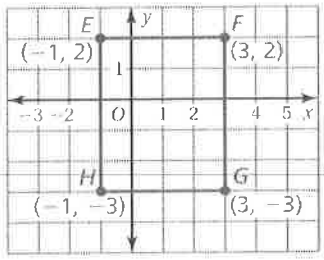
A. Add 10 to -20.

B. Distribute $-\frac{3}{2}$ to get $-12x - 15$.

C. Multiply both sides by $-\frac{2}{3}$ instead of $-\frac{3}{2}$.

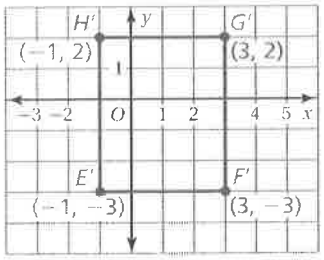
D. Multiply both sides by $\frac{3}{2}$ instead of $-\frac{3}{2}$.

65. On the grid below, Rectangle *EFGH* is plotted and its vertices are labeled.

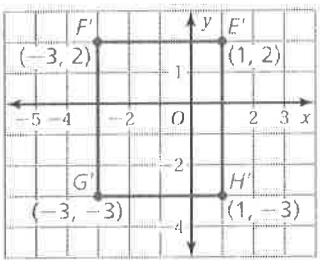


Which of the following shows Rectangle $E'F'G'H'$, the image of Rectangle *EFGH* after it is reflected in the x-axis?

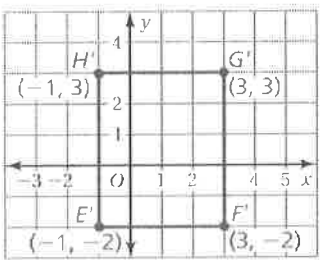
F.



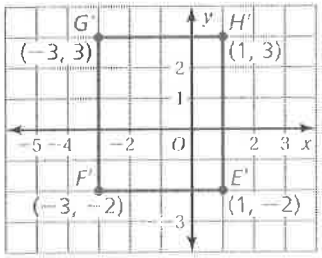
H.



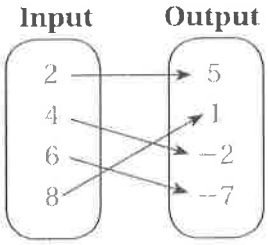
G.



I.



66. List the ordered pairs shown in the mapping diagram below.



A. (2, 5), (4, −2), (6, −7), (8, 1)

B. (2, −7), (4, −2), (6, 1), (8, 5)

C. (2, 5), (4, 1), (6, −2), (8, −7)

D. (5, 2), (−2, 4), (−7, 6), (1, 8)

V. The temperature fell from 54 degrees Fahrenheit to 36 degrees Fahrenheit over a 6-hour period. The temperature fell by the same number of degrees each hour. How many degrees Fahrenheit did the temperature fall each hour?

67. Solve the formula below for I.

$$A = P + PI$$

F. $I = A - 2P$

G. $I = \frac{A}{P} - P$

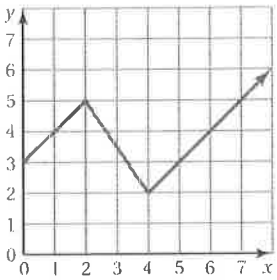
H. $I = A - \frac{P}{P}$

I. $I = \frac{A - P}{P}$

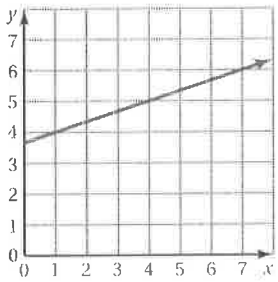
W A right circular cylinder has a volume of 1296 cubic inches. If you divide the radius of the cylinder by 12, what would be the volume, in cubic inches, of the smaller cylinder?

68. Which graph represents a linear function?

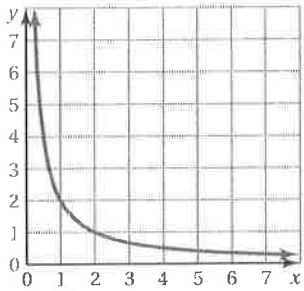
A.



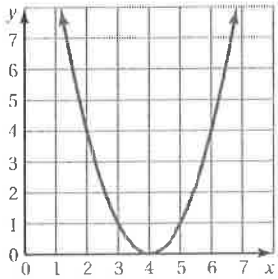
B.



C.

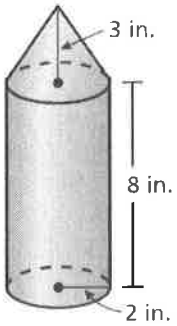


D.



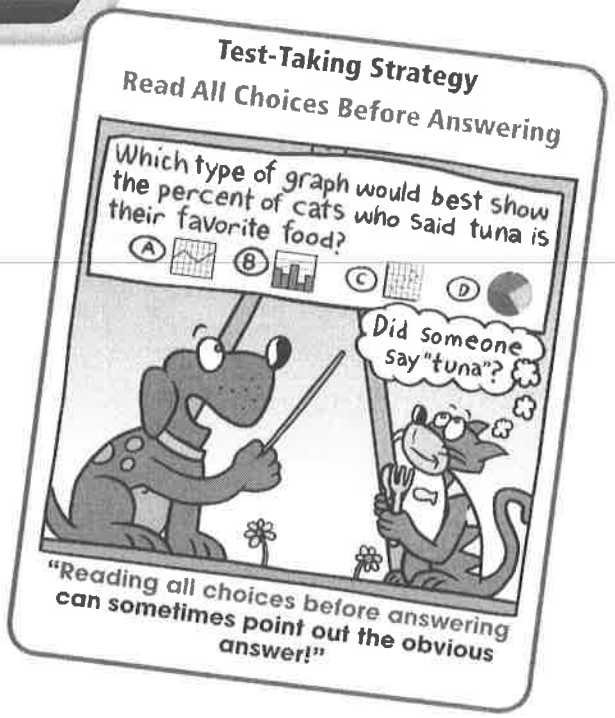
X. The figure below is a diagram for making a tin lantern.

Think
Solve
Explain

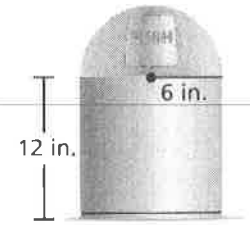


The figure consists of a right circular cylinder without its top base and a right circular cone without its base. What is the volume, in cubic inches, of the entire lantern? Show your work and explain your reasoning. (Use 3.14 for π.)

9 Cumulative Assessment



69. What is the volume of the trash bin?



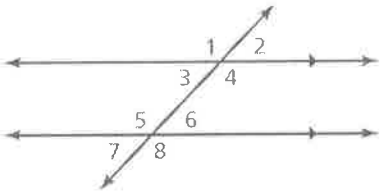
A. 288π in.^{3}

B. 576π in.^{3}

C. 648π in.^{3}

D. 720π in.^{3}

70. The diagram below shows parallel lines cut by a transversal. Which angle is the corresponding angle for $\angle 6$?



F. $\angle 2$

G. $\angle 3$

H. $\angle 4$

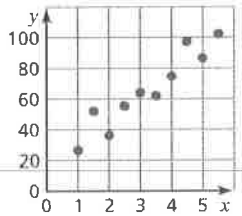
I. $\angle 8$

Y. You randomly survey students in your school. You ask whether they have jobs. You display your results in the two-way table. How many male students do *not* have a job?

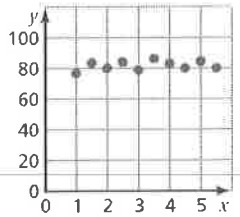
		Job	
		Yes	No
Gender	Male	27	12
	Female	31	17

71. Which scatter plot shows a negative relationship between x and y?

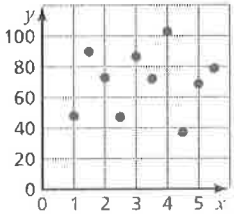
A.



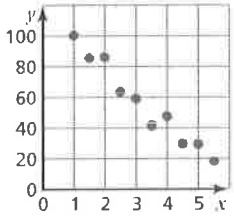
C.



B.



D.



72. The legs of a right triangle have the lengths of 8 centimeters and 15 centimeters. What is the length of the hypotenuse, in centimeters?

72. What is the solution of the equation?

$$0.22(x + 6) = 0.2x + 1.8$$

F. $x = 2.4$

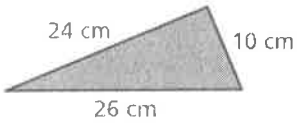
G. $x = 15.6$

H. $x = 24$

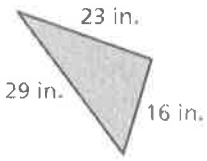
I. $x = 156$

73. Which triangle is *not* a right triangle?

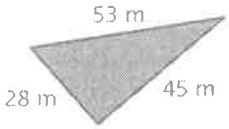
A.



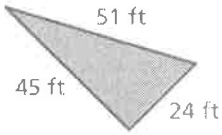
C.



B.



D.



74. A store has recorded total dollar sales each month for the past three years. Which type of graph would best show how sales have increased over this time period?

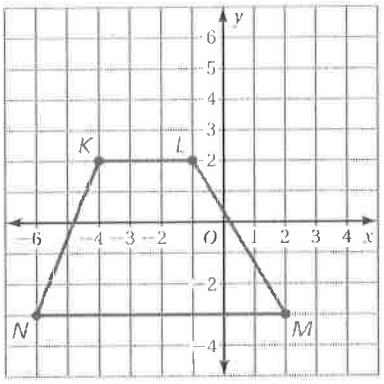
F. circle graph

G. line graph

H. histogram

I. stem-and-leaf plot

75. Trapezoid *KLMN* is graphed in the coordinate plane shown.



Rotate Trapezoid *KLMN* 90° clockwise about the origin. What are the coordinates of point *M′*, the image of point *M* after the rotation?

A. (−3, −2)

B. (−2, −3)

C. (−2, 3)

D. (3, 2)

AA

Think Solve Explain

. The table shows the numbers of hours students spent watching television from Monday through Friday for one week and their scores on a test that Friday.

Hours of Television, *x*	5	2	10	15	3	4	8	2	12	9
Test Score, *y*	92	98	79	66	97	88	82	95	72	81

Part A Make a scatter plot of the data.

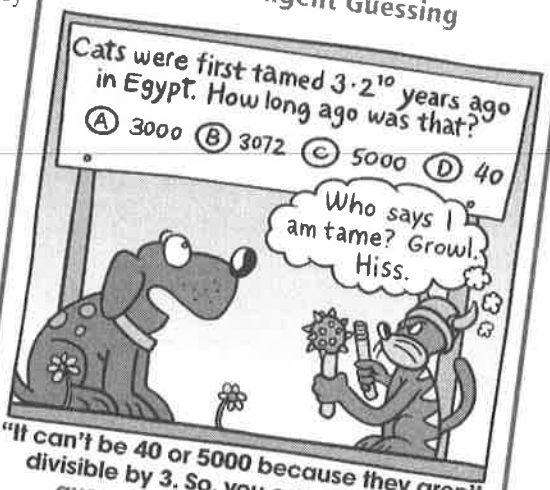
Part B Describe the relationship between hours of television watched and test score.

Part C Explain how to justify your answer in Part B using the linear regression feature of a graphing calculator.

10 Cumulative Assessment

Test-Taking Strategy

Use Intelligent Guessing



"It can't be 40 or 5000 because they aren't divisible by 3. So, you can intelligently guess between 3000 and 3072."

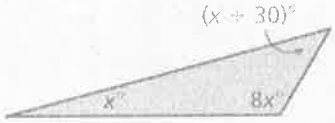
76. Mercury's distance from the Sun is approximately 5.79×10^7 kilometers. What is this distance in standard form?

A. 5,790,000,000 km **C.** 57,900,000 km

B. 579,000,000 km **D.** 5,790,000 km

77. The steps Jim took to answer the question are shown below. What should Jim change to correctly answer the question?

How many degrees are in the largest angle in the triangle below?



$$x + 8x + x + 30 = 180$$
$$10x = 150$$
$$x = 15$$

F. The left side of the equation should equal 360° instead of 180°.

G. The sum of the acute angles should equal 90°.

H. Evaluate the smallest angle when $x = 15$.

I. Evaluate the largest angle when $x = 15$.

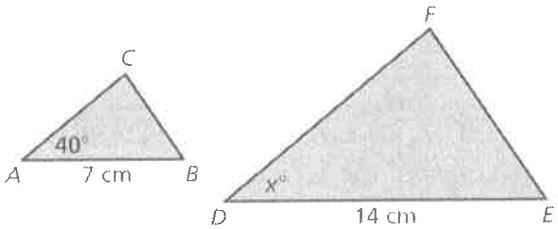
78. Which expression is equivalent to the expression below?

$$2^4 2^3$$

A. 2^{12} **C.** 48

B. 4^7 **D.** 128

BB In the figure below, $\triangle ABC$ is a dilation of $\triangle DEF$.



What is the value of x?

79. A bank account pays interest so that the amount in the account doubles every 10 years. The account started with \$5,000 in 1940. Which expression represents the amount (in dollars) in the account n decades later?

F. $2^n \cdot 5000$

G. $5000(n + 1)$

H. 5000^n

I. $2^n + 5000$

80. The formula for the volume V of a pyramid is $V = \frac{1}{3}Bh$. Solve the formula for the height h.

A. $h = \frac{1}{3}VB$

B. $h = \frac{3V}{B}$

C. $h = \frac{V}{3B}$

D. $h = V - \frac{1}{3}B$

CC

Think Solve Explain

The gross domestic product (GDP) is a way to measure how much a country produces economically in a year. The table below shows the approximate population and GDP for the United States.

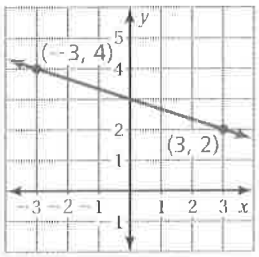
United States 2012	
Population	312 million (312,000,000)
GDP	15.1 trillion dollars (\$15,100,000,000,000)

Part A Find the GDP per person for the United States. Show your work and explain your reasoning.

Part B Write the population and the GDP using scientific notation.

Part C Find the GDP per person for the United States using your answers from Part B. Write your answer in scientific notation. Show your work and explain your reasoning.

81 What is the equation of the line shown in the graph?



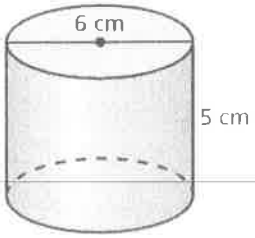
F. $y = -\frac{1}{3}x + 3$

G. $y = \frac{1}{3}x + 1$

H. $y = -3x + 3$

I. $y = 3x - \frac{1}{3}$

82. A cylinder and its dimensions are shown below.



What is the volume of the cylinder? (Use 3.14 for π.)

A. 47.1 cm^3

B. 94.2 cm^3

C. 141.3 cm^3

D. 565.2 cm^3

D.D. Find $(-2.5)^{-2}$.

83. Two lines have the same y-intercept. The slope of one line is 1, and the slope of the other line is -1. What can you conclude?

F. The lines are parallel.

G. The lines meet at exactly one point.

H. The lines meet at more than one point.

I. The situation described is impossible.

84. The director of a research lab wants to present data to donors. The data show how the lab uses a great deal of donated money for research and only a small amount of money for other expenses. Which type of display is best suited for showing these data?

A. box-and-whisker plot

B. circle graph

C. line graph

D. scatter plot

11 Cumulative Assessment

Test-Taking Strategy
Answer Easy Questions First

"Scan the test and answer the easy questions first. Because 2 < 3, A is correct."

85. What is the value of the expression below when $x = -5$, $y = 3$, and $z = -1$?

$$\frac{x^2 - 3y}{z}$$

A. -34 **C.** 16

B. -16 **D.** 34

86. What is the value of the expression below?

$$-\frac{3}{8} \cdot \frac{2}{5}$$

F. $-\frac{20}{3}$ **H.** $-\frac{15}{16}$

G. $-\frac{16}{15}$ **I.** $-\frac{3}{20}$

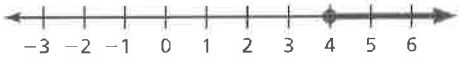
87. Which graph represents the inequality below?

$$\frac{x}{-4} - 8 \geq -9$$

A.


B.


C.


D.


88. Which value of p makes the equation below true?

$$5(p + 6) = 25$$

F. -1 **H.** 11

G. $3\frac{4}{5}$ **I.** 14

89. You set up the lemonade stand. Your profit is equal to your revenue from lemonade sales minus your cost to operate the stand. Your cost is $8. How many cups of lemonade must you sell to earn a profit of $30?

A. 4

B. 44

C. 60

D. 76

90. Which value is a solution of the inequality below?

$$3 - 2y < 7$$

F. -6

G. -3

H. -2

I. -1

EE. What value of y makes the equation below true?

$$12 - 3y = -6$$

91. What is the mean distance of the four points from -3?

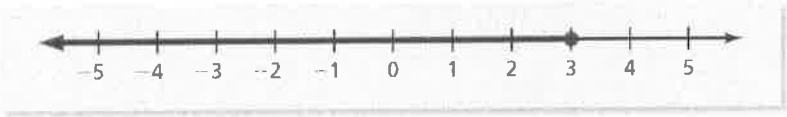
A. $-\frac{1}{2}$

B. $2\frac{1}{2}$

C. 3

D. $7\frac{1}{8}$

92. Martin graphed the solution of the inequality $-4x + 18 > 6$ in the box below.



What should Martin do to correct the error that he made?

F. Use an open circle at 3 and shade to the left of 3.

G. Use an open circle at 3 and shade to the right of 3.

H. Use a closed circle and shade to the right of 3.

I. Use an open circle and shade to the left of −3.

FF. What is the value of the expression below?

$$\frac{5}{12} - \frac{7}{8}$$

GG. You are selling T-shirts to raise money for a charity. You sell the T-shirts for $10 each.

Think Solve Explain

Part A You have already sold 2 T-shirts. How many more T-shirts must you sell to raise at least $500? Explain.

Part B Your friend is raising money for the same charity and has not sold any T-shirts previously. He sells the T-shirts for $8 each. What is the total number of T-shirts he must sell to raise at least $500? Explain.

Part C Who has to sell more T-shirts in total? How many more? Explain.

93. Which expression is equivalent to the expression below?

$$-\frac{2}{3} - \left(-\frac{4}{9}\right)$$

A. $-\frac{1}{3} + \frac{1}{9}$

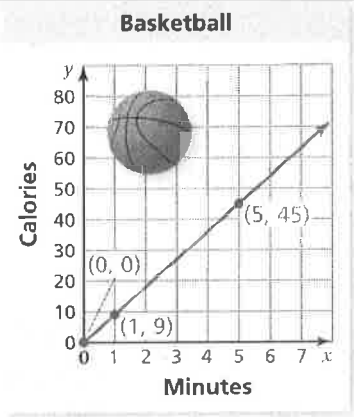
B. $-\frac{2}{3} \times \left(-\frac{1}{3}\right)$

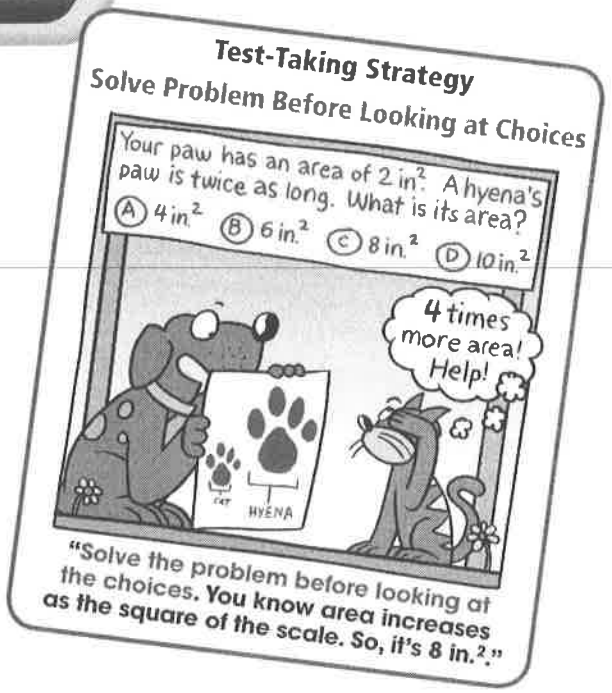
C. $-\frac{1}{3} - \frac{7}{9}$

D. $\frac{3}{2} \div \left(-\frac{1}{3}\right)$

12 Cumulative Assessment

94. The number of calories you burn by playing basketball is proportional to the number of minutes you play. Which of the following is a valid interpretation of the graph below?





A. The unit rate is $\frac{1}{9}$ calorie per minute.

B. You burn 5 calories by playing basketball for 45 minutes.

C. You do not burn any calories if you do not play basketball for at least 1 minute.

D. You burn an additional 9 calories for each minute of basketball you play.

HH. A lighting store is holding a clearance sale. The store is offering discounts on all the lamps it sells. As the sale progresses, the store will increase the percent of discount it is offering.

You want to buy a lamp that has an original price of \$40. You will buy the lamp when its price is marked down to \$10. What percent discount will you have received?

95. What is the value of the expression below?

$$2 - 6 - (-9)$$

F. -13

G. -5

H. 5

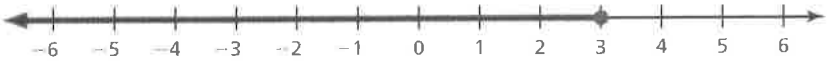
I. 13

II What is the solution to the proportion below?

$$\frac{8}{12} = \frac{x}{18}$$

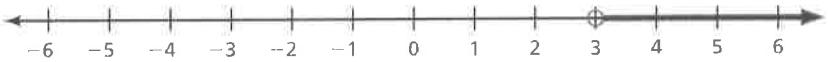
96. Which graph represents the inequality below?

$$-5 - 6x \leq -23$$

A.


B.


C.


D.


97. You are building a scale model of a park that is planned for a city. The model uses the scale below.

1 centimeter = 2 meters

The park will have a rectangular reflecting pool with a length of 20 meters and a width of 12 meters. In your scale model, what will be the area of the reflecting pool?

F. 60 cm^2

G. 120 cm^2

H. 480 cm^2

I. 960 cm^2

98. The quantities x and y are proportional. What is the missing value in the table?

x	y
$\frac{5}{7}$	10
$\frac{9}{7}$	18
$\frac{15}{7}$	30
4	

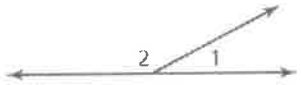
A. 38

B. 42

C. 46

D. 56

99. $\angle 1$ and $\angle 2$ form a straight angle. $\angle 1$ has a measure of 28°. What is the measure of $\angle 2$?



F. 62°

G. 118°

H. 152°

I. 208°

100. Brett solved the equation in the box below.

$$\frac{c}{5} - (-15) = -35$$
$$\frac{c}{5} + 15 = -35$$
$$\frac{c}{5} + 15 - 15 = -35 - 15$$
$$\frac{c}{5} = -50$$
$$\frac{c}{5} = \frac{-50}{5}$$
$$c = -10$$

What should Brett do to correct the error that he made?

A. Subtract 15 from -35 to get -20.

B. Rewrite $\frac{c}{5} - (-15)$ as $\frac{c}{5} - 15$.

C. Multiply each side of the equation by 5 to get $c = -250$.

D. Multiply each side of the equation by -5 to get $c = 250$.

JJ. A map of the state where Donna lives has the scale shown below.

Think
Solve
Explain

$$\frac{1}{2}\text{ inch} = 10\text{ miles}$$

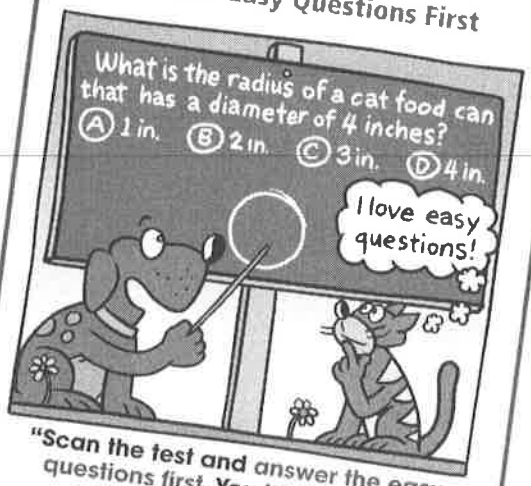
Part A Donna measured the distance between her town and the state capital on the map. Her measurement was $4\frac{1}{2}$ inches. Based on Donna's measurement, what is the actual distance, in miles, between her town and the state capital? Show your work and explain your reasoning.

Part B Donna wants to mark her favorite campsite on the map. She knows that the campsite is 65 miles north of her town. What distance on the map, in inches, represents an actual distance of 65 miles? Show your work and explain your reasoning.

13 Cumulative Assessment

Test-Taking Strategy

Answer Easy Questions First



"Scan the test and answer the easy questions first. You know that the radius is half the diameter."

101. To make 6 servings of soup, you need 5 cups of chicken broth. You want to know how many servings you can make with 2 quarts of chicken broth. Which proportion should you use?

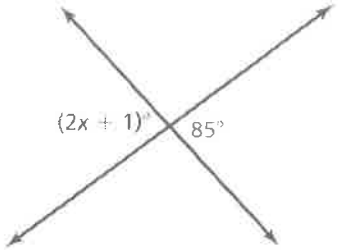
A. $\frac{6}{5} = \frac{2}{x}$

B. $\frac{6}{5} = \frac{x}{2}$

C. $\frac{6}{5} = \frac{x}{8}$

D. $\frac{5}{6} = \frac{x}{8}$

KK What is the value of x?



102 Your mathematics teacher described an equation in words. Her description is in the box below.

> "5 less than the product of 7 and an unknown number is equal to 42."

Which equation matches your mathematics teacher's description?

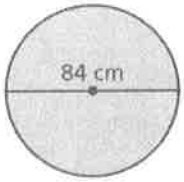
F. $(5 - 7)n = 42$

G. $(7 - 5)n = 42$

H. $5 - 7n = 42$

I. $7n - 5 = 42$

103. What is the area of the circle below? $\left(\text{Use } \frac{22}{7} \text{ for } \pi.\right)$



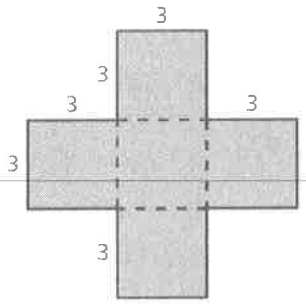
A. 132 cm^2

B. 264 cm^2

C. 5544 cm^2

D. 22,176 cm^2

104. John was finding the area of the figure below.



John's work is in the box below.

area of horizontal rectangle

$A = 3 \times (3 + 3 + 3)$

$= 3 \times 9$

$= 27$ square units

area of vertical rectangle

$A = (3 + 3 + 3) \times 3$

$= 9 \times 3$

$= 27$ square units

total area of figure

$A = 27 + 27$

$= 54$ square units

What should John do to correct the error that he made?

F. Add the area of the center square to the 54 square units.

G. Find the area of one square and multiply this number by 4.

H. Subtract the area of the center square from the 54 square units.

I. Subtract 54 from the area of a large square that is 9 units on each side.

105. Which value of x makes the equation below true?

$$5x - 3 = 11$$

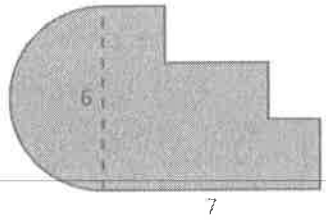
A. 1.6

B. 2.8

C. 40

D. 70

LL. What is the perimeter of the figure below? (Use 3.14 for π.)



106. Which inequality has 5 in its solution set?

F. $5 - 2x \geq 3$

G. $3x - 4 \geq 8$

H. $8 - 3x > -7$

I. $4 - 2x < -6$

107. Four jewelry stores are selling an identical pair of earrings.

- Store A: original price of \$75; 20% off during sale
- Store B: original price of \$100; 35% off during sale
- Store C: original price of \$70; 10% off during sale
- Store D: original price of \$95; 30% off during sale

Which store has the least sale price for the pair of earrings?

A. Store A

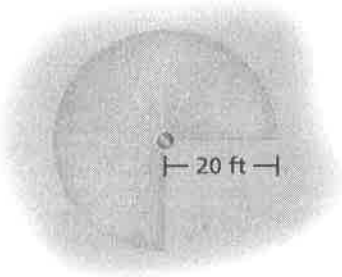
B. Store B

C. Store C

D. Store D

MM A lawn sprinkler sprays water onto part of a circular region, as shown below.

Think Solve Explain

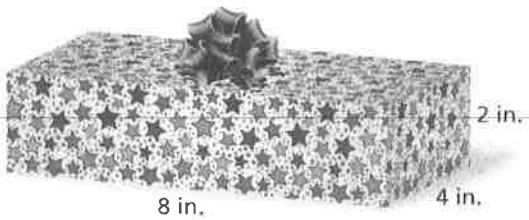


Part A What is the area, in square feet, of the region that the sprinkler sprays with water? Show your work and explain your reasoning. (Use 3.14 for π.)

Part B What is the perimeter, in feet, of the region that the sprinkler sprays with water? Show your work and explain your reasoning. (Use 3.14 for π.)

14 Cumulative Assessment

108. A gift box and its dimensions are shown below.



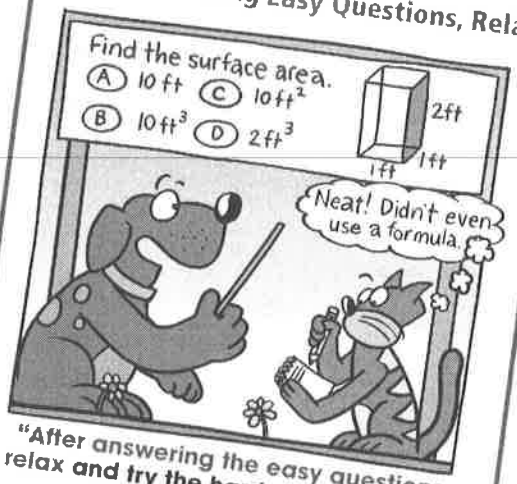
What is the least amount of wrapping paper that you could have used to wrap the box?

A. 20 in.^{2} **C.** 64 in.^{2}

B. 56 in.^{2} **D.** 112 in.^{2}

Test-Taking Strategy

After Answering Easy Questions, Relax



"After answering the easy questions, relax and try the harder ones. For this, you know area is measured in square units."

109. A student scored 600 the first time she took the mathematics portion of her college entrance exam. The next time she took the exam, she scored 660. Her second score represents what percent increase over her first score?

F. 9.1% **H.** 39.6%

G. 10% **I.** 60%

110. Raj was solving the proportion in the box below.

$$\frac{3}{8} = \frac{x-3}{24}$$

$$3 \cdot 24 = (x-3) \cdot 8$$

$$72 = x - 24$$

$$96 = x$$

What should Raj do to correct the error that he made?

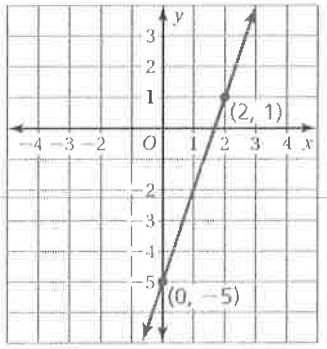
A. Set the product of the numerators equal to the product of the denominators.

B. Distribute 8 to get $8x - 24$.

C. Add 3 to each side to get $\frac{3}{8} + 3 = \frac{x}{24}$.

D. Divide both sides by 24 to get $\frac{3}{8} \div 24 = x - 3$.

111 A line contains the two points plotted in the coordinate plane below.



What is the slope of the line?

F. $\frac{1}{3}$

G. 2

H. 3

I. 6

NN. James is getting ready for wrestling season. As part of his preparation, he plans to lose 5% of his body weight. James currently weighs 160 pounds. How much will he weigh, in pounds, after he loses 5% of his weight?

112. How much material is needed to make the popcorn container?

A. 76π in.^{2}

B. 84π in.^{2}

C. 92π in.^{2}

D. 108π in.^{2}

113. To make 10 servings of soup you need 4 cups of broth. You want to know how many servings you can make with 8 pints of broth. Which proportion should you use?

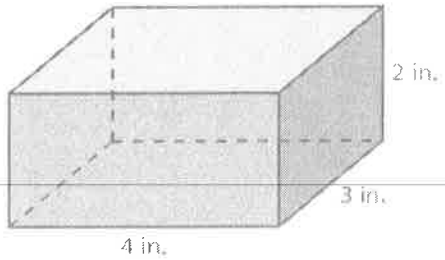
F. $\frac{10}{4} = \frac{x}{8}$

G. $\frac{4}{10} = \frac{x}{16}$

H. $\frac{10}{4} = \frac{8}{x}$

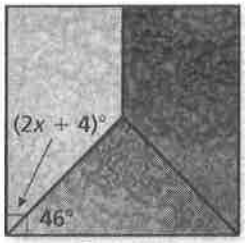
I. $\frac{10}{4} = \frac{x}{16}$

OO. A rectangular prism and its dimensions are shown below.



What is the volume, in cubic inches, of a rectangular prism whose dimensions are three times greater?

114. What is the value of x?



A. 20

B. 43

C. 44

D. 65

115. Which of the following could be the angle measures of a triangle?

F. 60°, 50°, 20°

G. 40°, 80°, 90°

H. 30°, 60°, 90°

I. 0°, 90°, 90°

PP. The table below shows the costs of buying matinee movie tickets.

Think
Solve
Explain

Matinee Tickets, x	2	3	4	5
Cost, y	\$9	\$13.50	\$18	\$22.50

Part A Graph the data.

Part B Find and interpret the slope of the line through the points.

Part C How much does it cost to buy 8 matinee movie tickets?

15 Cumulative Assessment

Test-Taking Strategy

Use Intelligent Guessing

"You know it can't be -10% or 500%. So, you can intelligently guess between 40% and 60%."

116. A school athletic director asked each athletic team member to name his or her favorite professional sports team. The results are below:

- D.C. United: 3
- Florida Panthers: 8
- Jacksonville Jaguars: 26
- Jacksonville Sharks: 7
- Miami Dolphins: 22
- Miami Heat: 15
- Miami Marlins: 20
- Minnesota Lynx: 4
- New York Knicks: 5
- Orlando Magic: 18
- Tampa Bay Buccaneers: 17
- Tampa Bay Lightning: 12
- Tampa Bay Rays: 28
- Other: 6

One athletic team member is picked at random. What is the likelihood that this team member's favorite professional sports team is *not* located in Florida?

A. certain

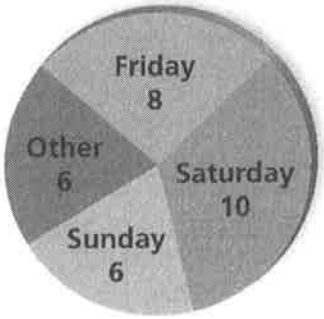
B. likely, but not certain

C. unlikely, but not impossible

D. impossible

QQ. Each student in your class voted for his or her favorite day of the week. Their votes are shown below:

Favorite Day of the Week



A student from your class is picked at random. What is the probability that this student's favorite day of the week is Sunday?

117. How far, in millimeters, will the tip of the hour hand of the clock travel in 2 hours? (Use $\frac{22}{7}$ for π.)

F. 44 mm

G. 88 mm

H. 264 mm

I. 528 mm

118. Nathaniel solved the proportion in the box below.

$$\frac{16}{40} = \frac{p}{27}$$

$$16 \cdot p = 40 \cdot 27$$

$$16p = 1080$$

$$\frac{16p}{16} = \frac{1080}{16}$$

$$p = 67.5$$

What should Nathaniel do to correct the error that he made?

A. Add 40 to 16 and 27 to p.

B. Subtract 16 from 40 and 27 from p.

C. Multiply 16 by 27 and p by 40.

D. Divide 16 by 27 and p by 40.

119. A North American hockey rink contains 5 face-off circles. Each of these circles has a radius of 15 feet. What is the total area, in square feet, of all the face-off circles? (Use 3.14 for π.)

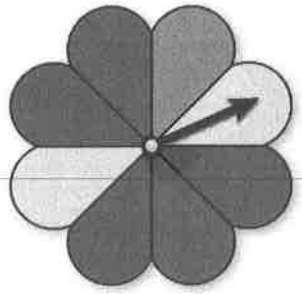
F. 706.5 ft^2

G. 2826 ft^2

H. 3532.5 ft^2

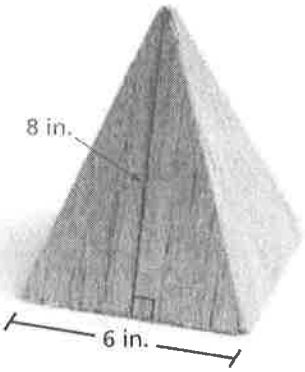
I. 14,130 ft^2

RR A spinner is divided into eight congruent sections, as shown below.



You spin the spinner twice. What is the probability that the arrow will stop in a yellow section both times?

120. What is the surface area, in square inches, of the square pyramid?



A. 24 in.^{2}

B. 96 in.^{2}

C. 132 in.^{2}

D. 228 in.^{2}

121. The value of one of Kevin's baseball cards was \$6.00 when he first got it. The value of this card is now \$15.00. What is the percent increase in the value of the card?

F. 40%

G. 90%

H. 150%

I. 250%

SS. You roll a number cube twice. You want to roll two even numbers.

Think
Solve
Explain

Part A Determine whether the events are independent or dependent.

Part B Find the number of favorable outcomes and the number of possible outcomes of each roll.

Part C Find the probability of rolling two even numbers. Explain your reasoning.