

1. Which expression is equivalent to $(x + 3)^2$?
 a. $x^2 + 6$ b. $x^2 + 9$

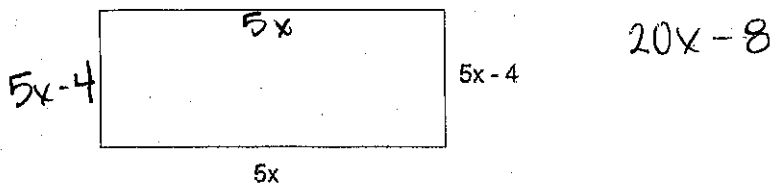
$$\begin{array}{r} x + 3 \\ x \begin{array}{|c|c|} \hline x^2 & 3x \\ \hline 3x & 9 \\ \hline \end{array} \\ +3 \end{array}$$

$$x^2 + 6x + 9$$

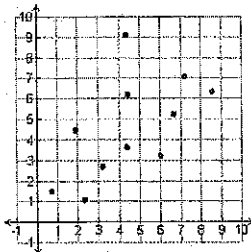
c. $2x^2 + 6x + 9$

d. $x^2 + 6x + 9$

2. Find the perimeter of the following figure.



3. What is true about the data shown below?



- a. There is a strong positive relationship between the variables.
 b. There is a strong negative relationship between the variables.
 c. There is a weak positive relationship between the variables.
 d. There is a weak negative relationship between the variables.

4. Lucy and Barbara began saving money the same week. The table below shows the models for the amount of money Lucy and Barbara had saved after x weeks. After how many weeks will Lucy and Barbara have the same amount of money?

Lucy's savings	$f(x) = 10x + 5$
Barbara's savings	$g(x) = 7.5x + 25$

- a. 1.1 weeks b. 1.7 weeks c. 8 weeks d. 12 weeks

5. The table below shows the charge for different numbers of shirts from an online website. The company charges a cost per shirt and a setup fee per order. What does the y -intercept of the equation of the line of best fit for the data represent?

Shirts Ordered (x)	Total Cost (y)
100	345
125	363
175	339

- a. The cost per shirt
 b. the setup fee
 c. the number of shirts ordered
 d. the maximum cost of an order

6. Given that a population of rabbits is modeled by $f(x) = 6(3)^x$, which statement best describes the population?

- a. increases by 3 b. multiplies by 6 c. increased by 18 d. triples

7. The math club sells candy bars and drinks during football games.

60 candy bars and 110 drinks will sell for \$265

120 candy bars and 90 drinks will sell for \$270

How much does each candy bar sell for?

$$\begin{array}{r} -2(60x + 110y = 265) \\ 120x + 90y = 270 \end{array}$$

$$\begin{array}{r} -120x - 220y = -530 \\ + 120x + 90y = 270 \\ \hline -130y = -260 \end{array}$$

$$\begin{array}{r} 60x + 110(2) = 265 \\ 60x + 220 = 265 \\ 60x = 45 \end{array}$$

$$y = 2$$

$$x = \frac{45}{60} = \frac{3}{4} = \boxed{0.75}$$

8. The number of points scored by a basketball team in the first 10 games of the season is shown:

52, 48, 60, 58, 72, 63, 80, 45, 57, 71

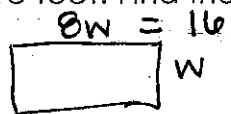
What would happen to the data distribution if the team scored 72, 58, 46, and 85 in their next 4 games?

- a. The standard deviation would decrease.
- b. The range would increase.
- c. The mean would decrease.
- d. The data would remain the same because they have scored these amounts before.

9. A condo purchased for \$88,500 in 2000. Its value appreciates 6.5% annually. When will it be worth \$100,000?

$88500 (1.065)^x$ increase
in 2 years \rightarrow 2002

10. There is a rectangular room whose length is 8 times its width. The area of the room is 32 square feet. Find the length of the room.



$w(8w) = 32$
 $8w^2 - 32 = 0$
 $8(w^2 - 4) = 0$

$\rightarrow 8(w+2)(w-2) = 0$
 ~~$w = -2$~~ $w = 2$

length = 16

11. Let $h(x) = 2^x$. Calculate the rate of change from $x = 3$ to $x = 7$.

$(3, 2^3)$ $(7, 2^7)$
 $(3, 8)$ $(7, 128)$

$\frac{128 - 8}{7 - 3} = \frac{120}{4} = 30$

12. Clara's and Michelle's parents started saving for college in 1998. Clara's parents started with \$2500 and are increasing the investment by \$500 each year. Michelle's parents also started with \$2500 and are increasing the investment by 10% each year. If x represents the number of years since 1998, about what year will Michelle's college fund first exceed Clara's college fund?

$2500 + 500x$ $2500(1.10)^x$

in 14 years \uparrow greater

1998
 $+ 15$
2013

- a. 2013
- b. 2015
- c. 2017
- d. 2019

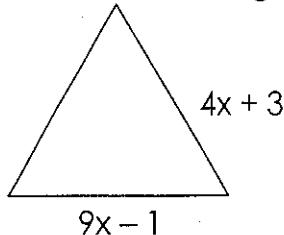
13. What is the largest of 3 consecutive positive integers if the sum of the smaller two integers is 11?

x 5
 $x+1$ 6
 $x+2$ 7

$x + x + 1 = 11$
 $2x + 1 = 11$
 $2x = 10$
 $x = 5$

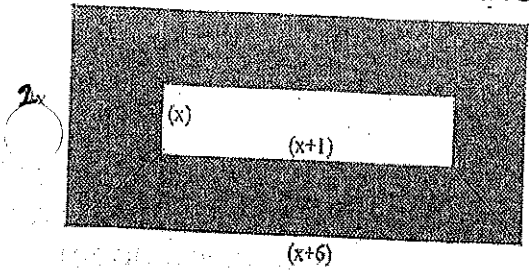
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14. Find the missing side of the triangle if its perimeter is $18x + 2$.



$18x + 2$
 $-(4x + 3)$
 $14x - 1$
 $-(9x - 1)$
5x

15. Find the area of the shaded region of the rectangular box:



$$2x(x+6) - x(x+1)$$

$$2x^2 + 12x - x^2 - x$$

$$x^2 + 11x$$

16. Dennis compared the y-intercept of the graph of the function $f(x) = 3x + 5$ to the y-intercept of the graph of the linear function that includes the points in the table below. What is the difference when the y-intercept of $f(x)$ is subtracted from the y-intercept of $g(x)$?

x	g(x)
-7	2
-5	3
-3	4
-1	5

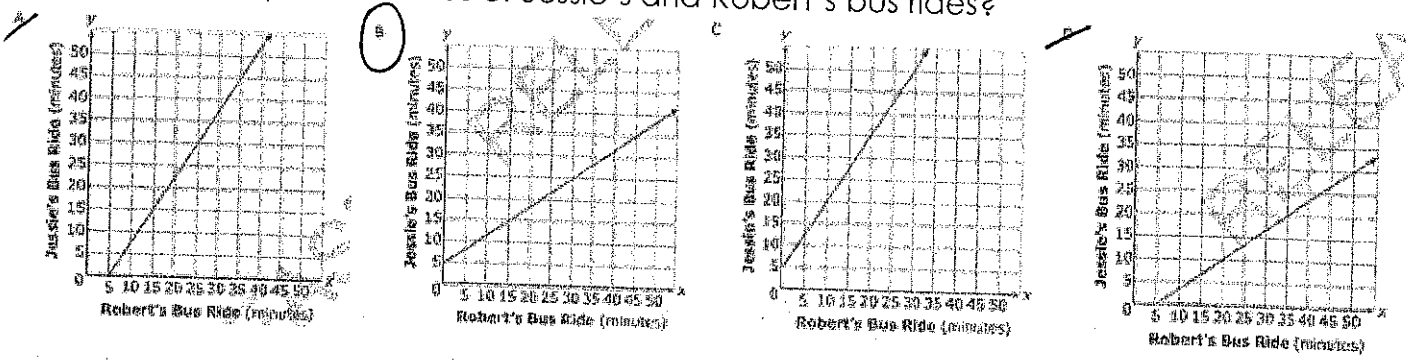
$$5.5 - 5 = .5$$

- a. 5
- b. -0.5
- c. 0.5
- d. 5.5

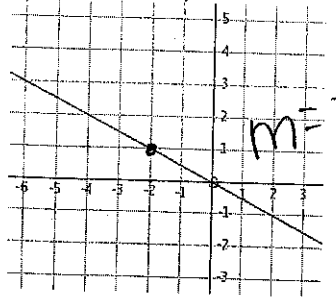
17. The boiling point of water, T (measured in degrees), at an altitude, a (measured in feet), is modeled by the function $T(a) = -0.0018a + 212$. In terms of altitude and temperature, which statement describes the meaning of the y-intercept?

- a. The boiling point of water at an altitude of -0.0018 feet is 212 degrees.
- b. The boiling point of water at an altitude of 0 is 212 degrees.
- c. The boiling point of water at an altitude of 0 is 211.998 degrees.
- d. The boiling point of water at an altitude of 212 feet is -0.0018 degrees.

18. Jessie's bus ride to school is 5 minutes more than $\frac{2}{3}$ the time of Robert's bus ride. Which graph shows the possible times of Jessie's and Robert's bus rides?



19. What is the equation of a line parallel to the one in the graph below that passes through the point $(-1, 3)$?



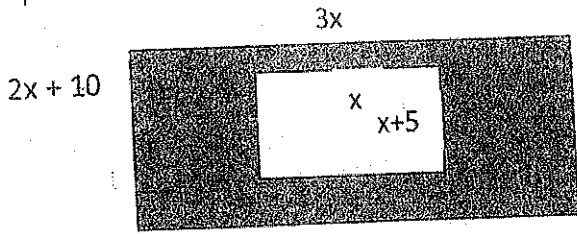
$$3 = -\frac{1}{2}(-1) + b$$

$$3 = \frac{1}{2} + b$$

$$\frac{5}{2} = b$$

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

20. A rectangular house sits on a rectangular lot as shown below. What polynomial represents the area of the lot NOT covered by the house (the shaded region)?



$$3x(2x+10) - x(x+5)$$

$$6x^2 + 30x - x^2 - 5x$$

$$5x^2 + 25x$$

21. A school group sells gift cards and gift wrap for a fundraiser. 6 gift cards and 10 gift wraps sell for \$49. 18 gift cards and 25 gift wraps sell for \$127. How much does each gift card cost?

$$6x + 10y = 49$$

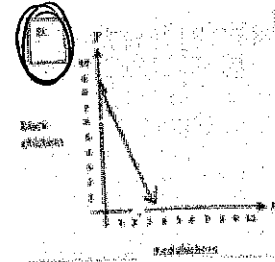
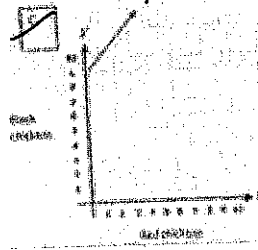
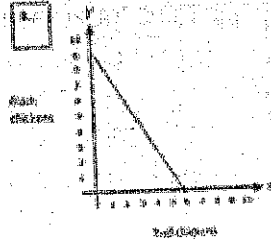
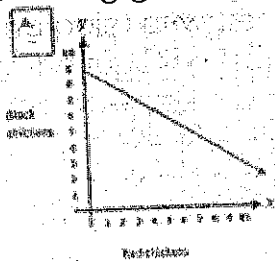
$$18x + 25y = 127$$

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

1.5 for gift cards

22. A farmer has 12 red chickens and 4 black chickens. Overall, the chickens lay 36 eggs each week. If x represents the red chickens and y represents the black chickens, which of the following gives a graph of the function?

$$12x + 4y = 36$$



23. A fully loaded Toyota 4runner sells for \$42,000. It depreciates 12% per year from the date of purchase. How many years will it take to be worth half its value?

$$y = 42000(0.88)^x$$

between 5 and 6 years → probably 6

24. Let $f(x) = 2(3)^x$. Calculate the rate of change from $x = 1$ to $x = 4$.

$$(1, 2(3)^1) \quad (4, 2(3)^4)$$

$$(1, 6) \quad (4, 162)$$

$$\frac{162 - 6}{4 - 1} = \frac{156}{3} = 52$$

25. Which table best represents a linear model?

x	y
1	5
2	8
3	10
4	11

x	y
1	5
2	15
3	45
4	100

x	y
4	2
6	3
8	4
11	5

x	y
5	-3
6	-5
8	-9
12	-17

26. The table below shows the area of several states. Iowa has an area of 57,000 square miles. Which statement is NOT TRUE if Iowa is included in the data set?

State	Area (thousands of square miles)
Connecticut	6
Georgia	59
Maryland	12
Massachusetts	11
New Hampshire	9
New York	54
North Carolina	54
Pennsylvania	46

- a. The standard deviation increases.
- b. The range would increase. x
- c. The mean would increase. ✓
- d. The interquartile range increases.