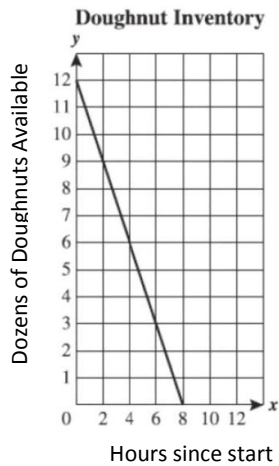


Part 1 - Shade the letter of the correct answer on your answer sheet.

1. Mrs. Goodson began selling doughnuts at her convenience store at 8 AM. The graph below shows the number of doughnuts she had over the course of the day. At what time did she sell out of doughnuts?



- a. 9 AM
 b. Noon
 c. 4 PM
 d. 8 PM
2. If you start with 4 and count by 3s, you get the sequence 4,7,10,...,N where 4 is the first number, 7 is the second number, 10 is the third number, and so forth. Find the value of the 15th term.
- a. 35
 b. 46
 c. 48
 d. 50

3. What is the value of x in the following equation?

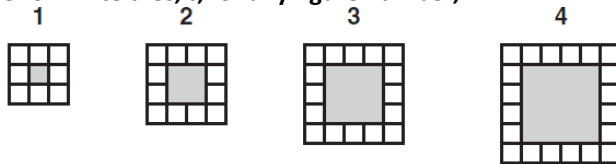
$$3x - 4(x + 1) + 10 = 0$$

- a. 2 b. 6 c. 10 d. -6

4. The cost of mailing a letter first-class is 29 cents for the first ounce and 23 cents for each additional ounce. A letter weighs exactly N ounces and the total mailing cost is \$1.90. What is the value of N ?
- a. 13 cents
 b. 9 ounces
 c. 8 ounces
 d. 7 ounces

5. Consecutive odd numbers are odd numbers that follow in order such as 5, 7, 9, and 11. The sum of five consecutive odd numbers is 85. What is the largest number of the five?
- 13
 - 21
 - 35
 - 85
6. When I open my math book, two pages face me and the sum of the two page numbers is 317. What is the number of the very next page?
- 158
 - 159
 - 160
 - 161
7. A taxi ride costs \$29.40. The driver charged \$3 plus \$0.40 per 0.2 mile traveled. How far did the taxi travel on this trip?
- 9.8 miles
 - 13.2 miles
 - 66 miles
 - 73.5 miles

8. Mrs. Morris gave her students this pattern of white tiles. She asked her students to write an equation to represent the number of white tiles, t , for any figure number, n .



Which equation represents the number of white tiles in the pattern?

- $t = n + 2$
 - $t = n + 4$
 - $t = 4n + 4$
 - $t = 4n + 8$
9. Eddie works the algebra problem $5(3x - 4) = 4x + 29$ as shown.

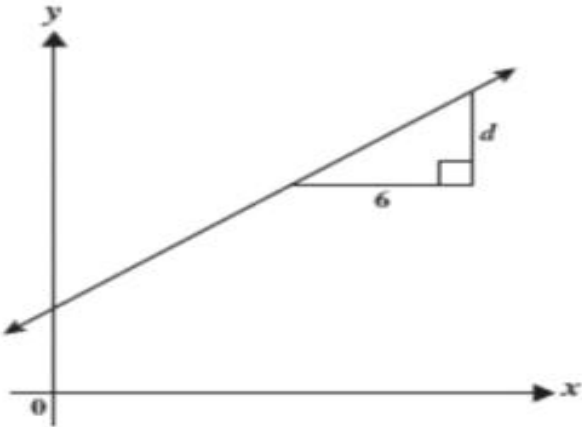
Problem	$5(3x - 4) = 4x + 29$
Step 1	$15x - 4 = 4x + 29$
Step 2	$15x - 4 - 4x = 4x - 4x + 29$
Step 3	$11x - 4 = 29$
Step 4	$11x - 4 + 4 = 29 + 4$
Step 5	$11x = 33$
Step 6	$x = 3$

Which statement about Eddie's work is correct?

- Eddie's work is correct; 3 is the correct answer
- Eddie made a mistake in step 1

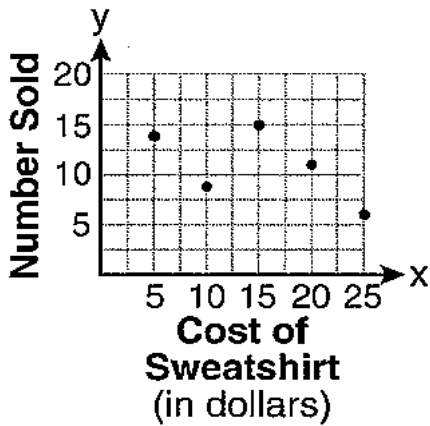
- c. Eddie made a mistake in step 3
- d. Eddie made a mistake in step 5

10. The slope of the line shown is $\frac{2}{3}$. Find the length of d .



- a. 2
- b. 3
- c. 4
- d. -6

11. A club did a study comparing the cost of a sweatshirt with the number of sweatshirts sold. The number of sweatshirts sold at various prices was recorded in the scatter plot below.



Which of the following could be an equation of the line showing the general trend of the data?

- a. $y = \frac{-2}{5}x + 20$
- b. $y = \frac{2}{5}x - 19$

c. $y = -\frac{3}{20}x + 12$

d. $y = -7x + 17$

12. Which equation best represents the set of data in the table?

x	y
-3	5
-2	4
1	1
4	-2

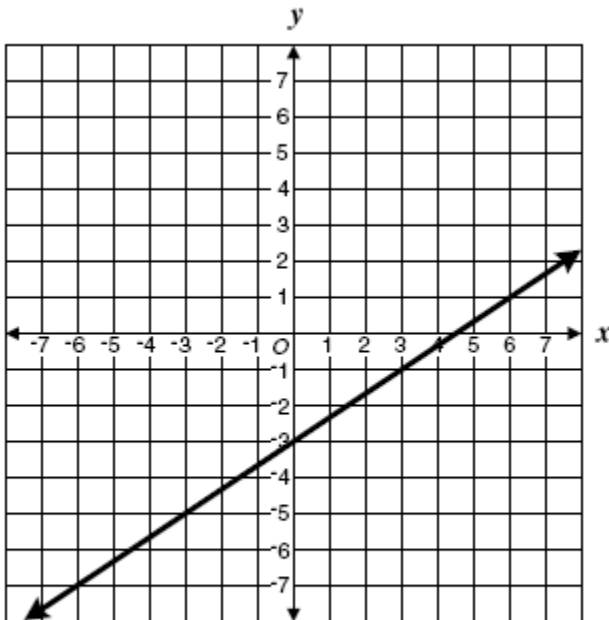
a $2x + y = -1$

b $x + y = 2$

c $x - y = -2$

d $x - y = -6$

13. Which equation most likely represents the line shown on the graph?



a. $y = \frac{2}{3}x - 3$

b. $y = 3x - 3$

c. $y = \frac{-2}{3}x + 3$

d. $y = \frac{-3}{4}x - 3$

14. The perimeter of a rectangular field is 244 ft. If its length is 2 feet longer than twice its width, what are the dimensions of the field?

a. a. 40 ft, 82 ft

b. b. 21 ft, 40 ft

c. c. 20 ft, 42 ft

d. d. 42 ft, 80 ft

15. Mrs. Gumas bought 4 pencils and 3 pens for \$5.60. Mr. Houston bought 2 pencils and 3 pens of the same kind for \$4.60. What is the price of each pencil and each pen?

a. \$0.50 per pencil, \$1.20 per pen

b. \$0.17 per pencil, \$1.64 per pen

c. \$1.70 per pencil, \$0.20 per pen

d. \$0.80 per pencil, \$0.80 per pen

16. A student solved the following inequality as shown.

Problem	$9 - 5(2x + 1) \geq -28$
Step 1	$9 - 10x - 5 \geq -28$
Step 2	$4 - 10x \geq -28$
Step 3	$4 - 10x \geq -28$
	$\begin{array}{r} -4 \qquad -4 \\ \hline -10x \geq -32 \end{array}$
Step 4	$\begin{array}{r} -10x \geq -32 \\ \hline -10 \quad -10 \end{array}$
Step 5	$x \geq 3.2$

In what step is there a mistake?

a. Step 1

b. Step 3

c. Step 5

d. There are no mistakes. The answer in step 5 is correct.

17. Gloria manages an apartment building. The total number of apartments in the building is 18. The building has only two sizes of apartments: small and large. The table below shows the rental income per month for each apartment size.

Apartment Size	Rental Income per Month
Small	\$800
Large	\$1200

Last month all the apartments were rented and the total income for the month was \$17,600. Let x be the number of small apartments in the building and y be the number of large apartments in the building. Select the system of equations that represents the information in terms of x and y .

- a. $1200x + 800y = 17600$; $x + y = 18$
- b. $800x + 1200y = 17600$; $x + y = 18$
- c. $x + y = 17600$; $800x + 1200y = 18$
- d. $x + 1200y = 17600$; $800x - y = 18$

18. If the pattern were to continue, how many hexagons would be in the 5th figure?

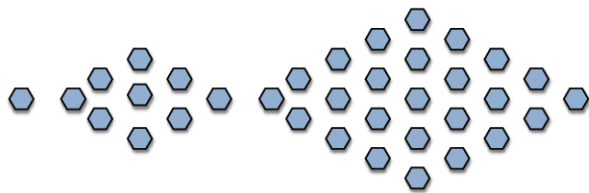


Figure 1

Figure 2

Figure 3

- a. 36
- b. 49
- c. 64
- d. 81

19. E. coli bacteria reproduce by a simple process called binary fission—each cell increases in size and divides into two cells. In the laboratory, E. coli bacteria divide approximately every 15 minutes. A new E. coli culture is started with 1 cell. After what 15-minute interval will you have at least 500 bacteria?

- a. 250
- b. 63
- c. 33
- d. 9

20. Which expression is equivalent to $-4a(3a - 5b)$?

- a. $-12a^2 + 20ab$
- b. $-12a^2 - 20ab$
- c. $-12a^2 + 20a$
- d. $-12a^2 + 9ab$

21. Which number is equivalent to the expression $3^2 \cdot 3^{-3}$?

- a. 3
- b. -1
- c. $\frac{1}{769}$
- d. $\frac{1}{3}$

22. When simplified, $(2x^2y^3)^4$ equals :

- a. $8x^6y^7$
- b. $8x^8y^{12}$
- c. $16x^6y^7$
- d. $16x^8y^{12}$

23. The function $f(x)$ contains ordered pairs of the form (x, y) . $f(x) = \{(6, 5), (2, 3), (1, 4)\}$. What is the range of the function?

- a. $\{4\}$
- b. $\{1, 2, 3, 4, 5, 6\}$
- c. $\{1, 2, 6\}$
- d. $\{3, 4, 5\}$

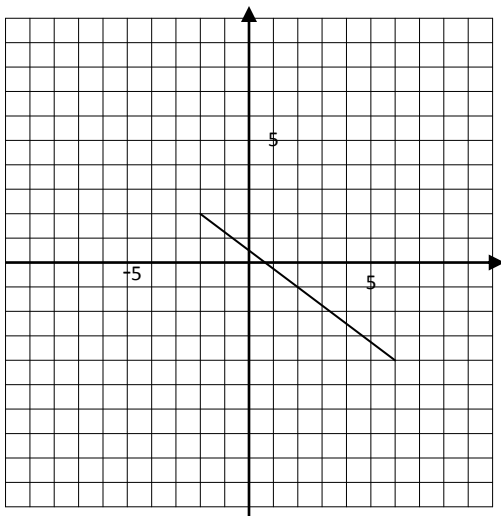
24. The ordered pairs in the sets below are of the form (x, y) . In which set is y a function of x ?

- a. $\{(1, -2), (1, 0), (1, 5), (1, 7)\}$
- b. $\{(1, 3), (2, 6), (3, 1), (6, 3)\}$
- c. $\{(0, 3), (1, 4), (2, 4), (2, 8)\}$
- d. $\{(1, 3), (3, 1), (3, 4), (4, 3)\}$

25. Which of these pairs of the form (x, y) , could not lie on the graph of a function of x ?

- a. $(1, 1)$ and $(3, 1)$
- b. $(1, 1)$ and $(1, 2)$
- c. $(1, 1)$ and $(2, 1)$
- d. $(1, 1)$ and $(2, 2)$

26. What is the domain of the function shown in the graph?



- a. $-2 < x \leq 2$
- b. $-4 \leq x \leq -6$
- c. $-4 < x \leq 2$
- d. $-2 < x \leq 6$

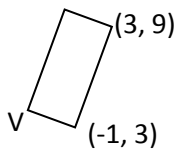
27. If $f(x) = \frac{(3-x)^2}{3-x}$ what is $f(2)$?

- a. -2
- b. -1
- c. 2
- d. 1

28. Solve $|3x + 6| = 18$

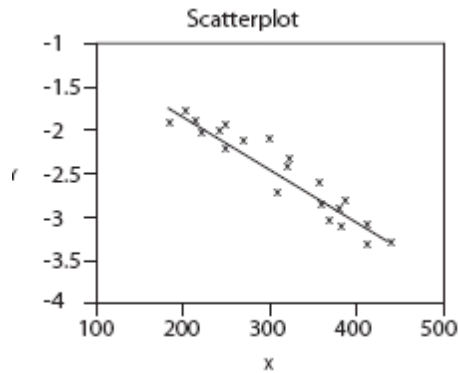
- a. $x = 4$
- b. $x = 4$ or $x = -4$
- c. $x = 4$ and $x = -8$
- d. $x = 4$ and $x = 8$

29. The coordinates of two vertices of a rectangle are indicated in the picture. Which of the following could be coordinates of vertex, V?



- a. (-4, 5)
- b. (-5, 12)
- c. (-3, 2)
- d. (-2, 5)

30. Which of the choices is the correct description of the correlation of the scatter plot below?



- a. Strong and positive
- b. Strong and negative
- c. Very weak and negative
- d. Very weak and positive

31. The formula for simple interest is $I = prt$. Which of the following shows this equation correctly expressed in terms of p ?

- a. $p = I - (rt)$
- b. $p = Irt$
- c. $p = \frac{rt}{I}$
- d. $p = \frac{I}{rt}$

32. Which of the following shows the factored form of $x^2 + 2x - 8$?

- a. $(x - 2)(x + 4)$
- b. $(x - 4)(x + 2)$
- c. $(x - 1)(x + 8)$
- d. $(x + 1)(x - 8)$

33. The projected worth (in millions of dollars) of a large company is modeled by the equation $y = 241(1.03)^x$. The variable x represents the number of years since 2000. What is the projected annual percent of growth, and what should the company be worth in 2012?

- a. 3%; \$333.60 million
- b. 3%; \$343.61 million
- c. 13%; \$353.92 million
- d. 13%; \$248.23 million

34. Given the sequence 6, 9.6, 15.36, 24.58, . . .

Which formula represents this sequence?

- a. $u_0 = 6$ $u_{n+1} = 0.6 \cdot u_n$
- b. $u_0 = 1$ $u_{n+1} = 6 \cdot u_n$
- c. $u_0 = 6$ $u_{n+1} = 1.6 \cdot u_n$
- d. $u_0 = 3$ $u_{n+1} = 2 \cdot u_n$

35. Mike kept track of the number of passengers on his bus, noticing the following:

- At the first stop, p passengers got on the empty bus.
- At the second stop, the number of passengers doubled when more people got on.
- At the third stop, 3 passengers got off the bus and no passengers got on.
- At the fourth stop, 2 passengers got on the bus and no passengers got off.

Which expression represents the number of passengers on the bus after the fourth stop?

- a. $2p + 5$
- b. $2p - 1$
- c. $2p - 5$
- d. $2p + 1$

36. Solve for x : $2(x-3) + 4x = 15 + 2x$

- a. $x=21$
- b. $x=4$
- c. $x = \frac{21}{4}$
- d. $x = \frac{4}{21}$

37. Which equation below describes a function that increases most quickly as x increases?

- a. $y = 4(5)^x$
- b. $y = 5(4)^x$
- c. $y = 4(0.2)^x$
- d. $y = 5(0.25)^x$

38. Which equation below is equivalent to $y - 2 = 3(x - 1)$?

- a. $6x - 2y = 2$
- b. $2x - 6y = 4$
- c. $3x - 2y = 2$
- d. $y = -3x - 1$

39. Which set of coordinate pairs is the solution to the equation $2x + 3y = 14$

- a. $(6, -2)$
- c. $(-2, 6)$

b. (2, -6)

d. (3, 8)

40. Evaluate the expression, $-3x^2y + y^2$ when $x = -5$ and $y = 2$.

a. 146

c. -142

c. -146

d. 154

41. For what values of a is $\sqrt{10 - a}$ defined?

a. $a > 0$

b. $a < 10$

c. $a \leq 10$

d. $a > 10$

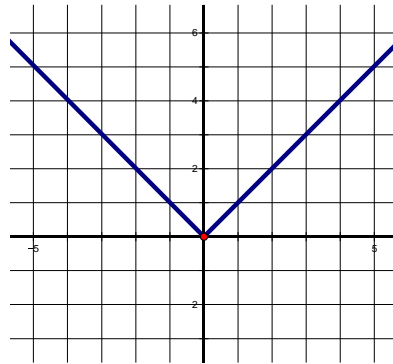
42. Which function best represents the graph to the right?

a. $f(x) = x$

b. $f(x) = x^2$

c. $f(x) = \sqrt{x}$

d. $f(x) = |x|$



43. Which function best represents the values in the table below?

x	y
-3	-27
-1	-1
0	0
2	8
5	125

a. $f(x) = x$

b. $f(x) = x^3$

c. $f(x) = \sqrt{x}$

d. $f(x) = |x|$

44. Look at the table of values below. Which answer choice describes the type of function that the values represent?

x	-2	-1	0	1	2	3
y	-5	1	3	1	-5	-15

a. Quadratic function that opens up

b. Quadratic function that opens down

c. Linear function that rises

d. Linear function that falls

45. Determine the roots of the quadratic equation $y = x^2 + 5x + 6$

- a. (2, 0) and (3, 0)
- b. (-2, 0) and (-3, 0)
- c. (-2, 0) and (3, 0)
- d. (2, 0) and (-3, 0)

46. Which of the following observations are true about $f(x) = x^2 + 1$ and $g(x) = x^2 - 1$

- A. f and g each have two x-intercepts
- B. f and g each have one x-intercept
- C. f has zero x-intercepts and g has two x-intercepts
- D. f has two x-intercepts and g has zero x-intercepts

Part II - For each problem, show your work in the box and write your answer on the line.

1. A linear relationship is shown in the table below. What will y be when x is 6?

x	0	1	3	5	6
y	5.5	7	10	13	

1. _____

2. Roses-R-Red Florist charges \$0.75 for each flower in an arrangement and \$20.00 for delivery. If the charge for a particular arrangement to be delivered was \$32.00, how many flowers were in the arrangement?

2. _____

3. Solve for x in $5(x + 2) - 3x = 13 + 3x$.

3. _____

4. Write an equation for all the numbers 2 units from 6.

4. _____

5. Given that $u_0 = 3$ and $u_{n+1} = u_n + 7$, when n is a positive integer Find n so that $u_n = 360$. Show your work in the box and write your answer on the line.

5. _____

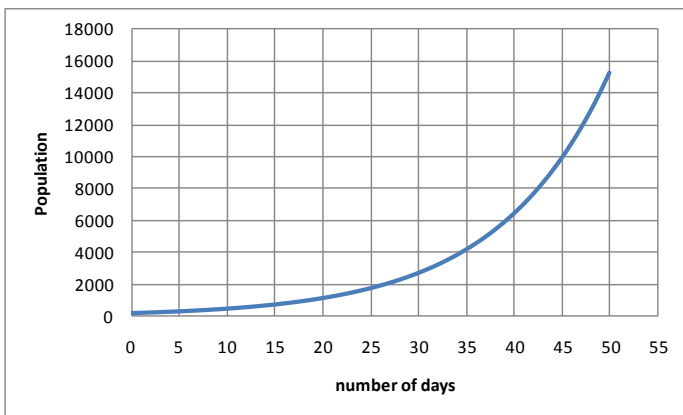
6. If you throw a ball straight up (with initial height of 4 feet) at 64 feet per second, how long will it take to fall back to the starting point? The function $h(t) = -16t^2 + v_0t + h_0$ describes the height, h in feet, of an object after t seconds, with initial velocity v_0 and initial height h_0 .

6. _____

7. Joe owns a small plot of land 20 feet by 30 feet. He wants to double the area by increasing both the length and the width, keeping the dimensions in the same proportion as the original. What will be the new length and width?

7. _____

8. The population of a certain bug increases according to the graph below. After approximately how many days will the population exceeds 9000?



9. Two hundred items were sold at a snack stand for a total of \$130.00. The only items sold were cans of pop for \$0.50 and bags of popcorn for \$0.75. How many of each item were sold ? Write you answers on the lines.

Cans of pop _____

Bags of popcorn _____

10. The equation $2|x - 1| - 10 = -4$ has two real solutions.

Determine the negative solution to the equation.

11. Given that $u_0 = 4$ and $u_{n+1} = 3u_n$, find the value of u_4 and write the explicit equation.

$U_4 =$ _____
 $y =$ _____

12. \$390 is invested at 7% interest compounded annually. Calculate the approximate value of the investment after 15 years.

12. _____

13. Estimate the solution to $3^x = 20,000$.

13. _____

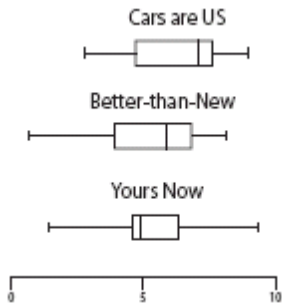
Part III - These problems may contain multiple questions from a single situation.

BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.

- Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.
- If you do the work in your head, explain in writing what work you did.

1. Each box-and-whisker plot shows the prices (in thousands of dollars) of used cars advertised for sale at three car dealerships.

a. If you want to go to the dealer whose prices seem least expensive, which dealer would you go to?



Dealer: _____

b. Write a sentence using summary statistics (words like mean, median, mode, quartile, etc.) to explain the car dealership that you would choose.

2. Line j is represented by the equation below.

$$\text{line } j: y = 2x + 4$$

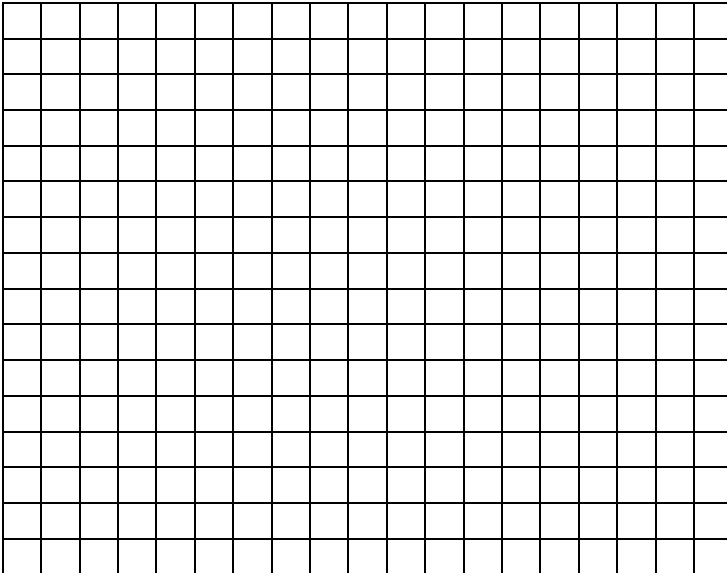
a. What is the slope of line j ?

b. What is the slope of any line that is parallel to line j ?

c. Write an equation for the line, k , that is parallel to line j and passes through the point with coordinates $(3,7)$. Show or explain how you got your answer.

d. Write an equation for the line, h , that is perpendicular to line j and passes through the point with coordinates $(8,10)$. Show or explain how you got your answer.

3. Sketch the graph of $y = 2^x$



4. A sequence begins 2, 4, 8, 16,

a. Identify the next three terms in the sequence.

b. Write a recursive formula for the geometric sequence above and determine the 20th term.

5. Simplify each expression. Your answer should have only positive exponents.

a) $\frac{a^{-4}b^3c^4}{a^2b^{-2}c^5} =$

b) $\sqrt{8}$

c) $\sqrt[3]{a \cdot b^3}$

d) $(2x^3)^2(4x^5)$

6. You have won a door prize and are given a choice between two options:

- a. \$150 invested at 4% compounded annually.
- b. \$200 invested at 3% compounded annually.

A. How much is each worth at the end of 10 years?

B. If the money was allowed to sit in the bank for 100 years, would the two investments at any time ever be equal? _____

C. Give at least one reason to support your answer to part B.

7. Only chocolate and vanilla ice cream cones are sold at an ice cream store. In one day, the number of chocolate cones sold was 1 more than 4 times the number of vanilla cones sold. A total of 121 cones were sold that day.

Let c = the number of chocolate cones sold

Let v = the number of vanilla cones sold

- Write equations to determine the number of chocolate cones sold that day.
- Use the equations to determine the number of chocolate cones sold that day.

Show your work using words, numbers, and/or diagrams.

How many chocolate cones were sold that day? _____

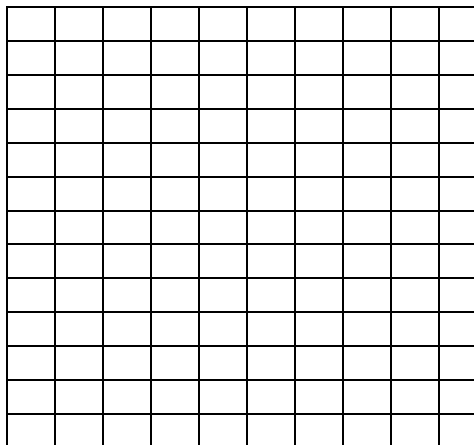
8. Solve the equation by completing the square $x^2 + 8x = -15$. Show all steps.

9. A gas station's 10,000 gallon right circular cylinder underground storage tank contains 1,000 gallons of gasoline. Tanker trucks pump gasoline in to the tank at a rate of 400 gallons per minute.

a. Write an equation that relates time, t , in minutes to the amount of gasoline, g , in gallons in the tank.

b. How long will it take to fill the tank?

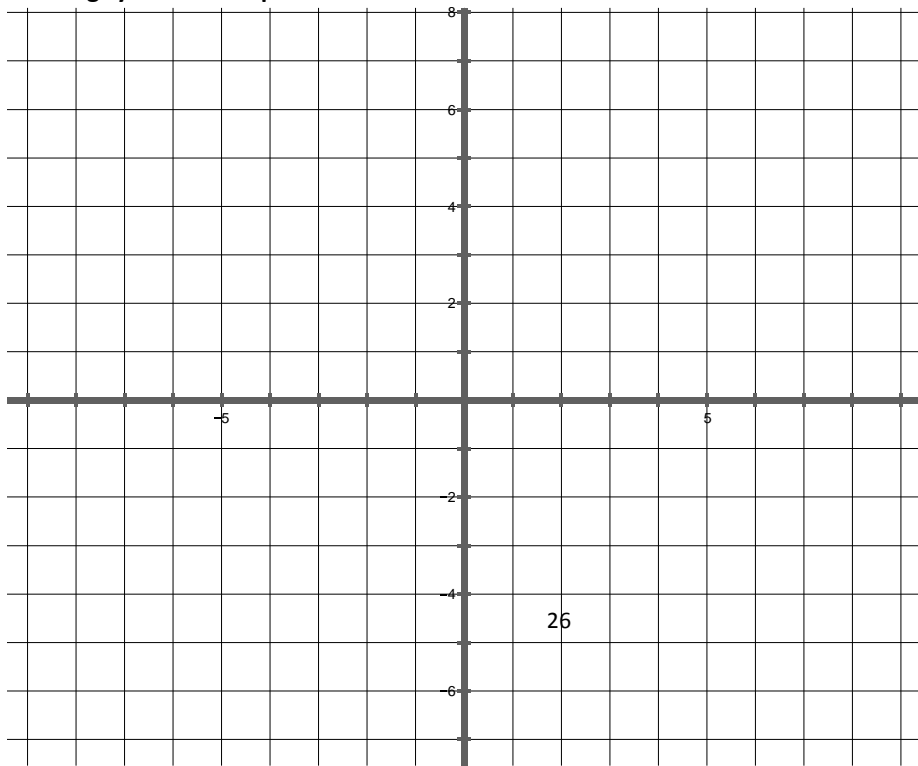
c. Graph the function.



d. If the flow rate increases from 400 to 500 gallons per minute, how will the graph change? Write an equation that represents the new situation.

10. Solve the equation by using the quadratic formula $2x^2 + 3x - 1 = 0$. Show all steps

11. Graph the following system of inequalities



$$x - y \leq 5$$

$$y < -2x + 3$$