

Algebra 1 Pre-Course Packet

Name: _____

Date: _____

1. Which of the following expressions is *not* equal to 1?

A. 3^0

B. 1^5

C. $\sqrt{1}$

D. -1^3

2. Simplify: $\frac{2^{-3}4^2}{9^3} \div \frac{2^54}{9^{-1}}$

A. $\frac{2^34^3}{9^4}$

B. $\frac{2^24^3}{9^2}$

C. $\frac{4^3}{2^89^4}$

D. $\frac{4}{2^89^4}$

3. Consider the following patterns:

720, 243, 81, 27, 9, _____, _____, _____, _____, _____

and

$3^6, 3^5, 3^4, 3^3, 3^2, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}, \underline{\hspace{1cm}}$

- a) Complete each pattern.
- b) What is the connection between the two patterns?
- c) Come up with a rule about exponents that explains the pattern.

4. The surface area of a cube is 3456. How long is each side?

A. 22

B. 23

C. 24

D. 25

5. Simplify: $\sqrt{100} + \sqrt{25}$

6. Assume another planet is 10^8 million miles away from the earth. If an astronaut in the future can travel 10^5 million miles per week, about how many weeks would it take for her to reach the other planet?

A. 3 weeks

B. 1,000 weeks

C. 3,000 weeks

D. 1,000,000 weeks

7. Express 12,800 in scientific notation.

8. The sun is 9.3×10^7 miles from earth. If a rocket is able to travel twice this distance, how far will it go?

A. 1.8×10^7

B. 9.3×10^7

C. 1.86×10^8

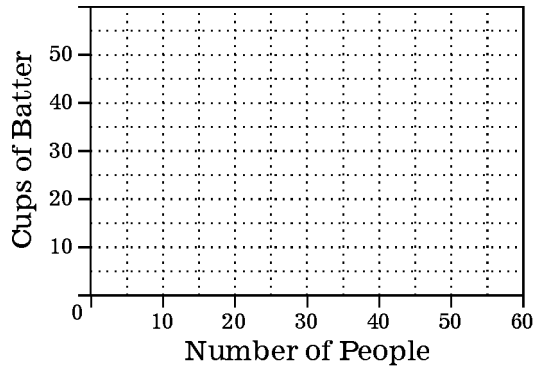
D. 1.86×10^9

9. Express the quotient of 5,550,000,000 and 3,000 in scientific notation.

10. The amount of pancake batter that you must mix increases with the number of people who come to breakfast. The table shows the number of cups of batter required to serve the number of people indicated. Draw the graph of this scenario on the figure provided.

Pancake Batter

Number of People	10	25
Cups of Batter	7	17.5



How many cups of batter must you prepare to serve 50 people?

- A. 15 B. 25 C. 35 D. 40
11. If the y -intercept of the graph of $y = -4x - 2$ is changed to 5 but the x -intercept remains the same, what is the equation of the new graph?
- A. $y = 5x - 2$ B. $y = 2x - 5$ C. $y = -4x + 5$ D. $y = 5$
12. Complete the table. Use slope-intercept form where applicable

equation	$y = mx + b$	slope	y -int.	x -int.
$3x + 4y = 24$				
$5x - y - 2 = 0$				
$3y - 27 = 0$				
$4x = 12$				
$3x - (6y - 12) = 0$				

13. Solve: $7m + 11 - 5m - 2 = 2m - 9$

A. -2

B. 7

C. no solution

D. infinitely many solutions

14. Solve. $8y + 9 = 6y - 5$

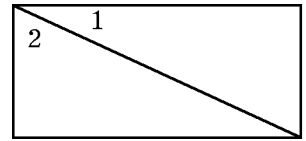
15. The corner of a rectangle is comprised of two angles as shown. The measure of one angle is 10° more than three times the measure of the other. What are the measures of the two angles? (Hint: Recall the degree measure of the corner of a rectangle.)

A. 15° and 75°

B. 20° and 70°

C. 30° and 60°

D. 45° and 45°



16. Plot the following points: $A(2, 3)$, $B(7, 3)$, $C(7, 8)$ and $D(2, 8)$

a) What is the equation of the line joining points A and C ?

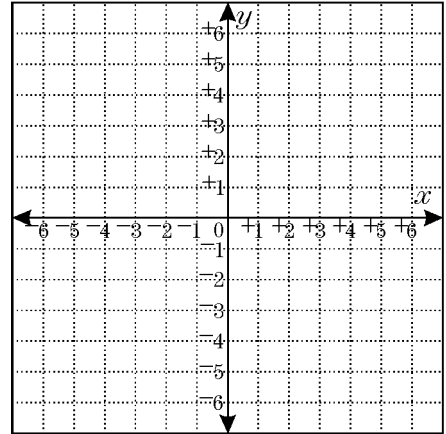
b) What is the equation of the line joining points B and D ?

c) Are the lines in parts (a) and (b) perpendicular?

d) At what point do the diagonals intersect?

17. After graphing $y = 2x$ and $y = 2(x + 3)$, what can be said about the lines?

- A. They intersect in one point. B. They intersect in two points.
C. They are parallel. D. They are perpendicular.



18. Solve the set of equations:

$$\begin{aligned}x - 2y &= 7 \\ 3x + 4y &= -4\end{aligned}$$

19. The equations of two lines are:

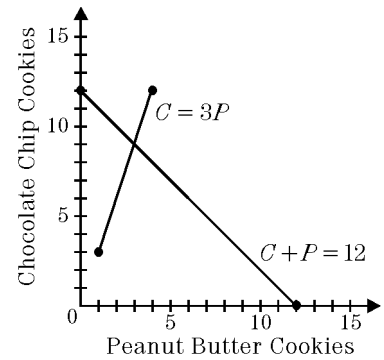
$$\begin{aligned}4x + y &= 10 \\ 3x - 2y &= 13\end{aligned}$$

What is the intersection of these two lines?

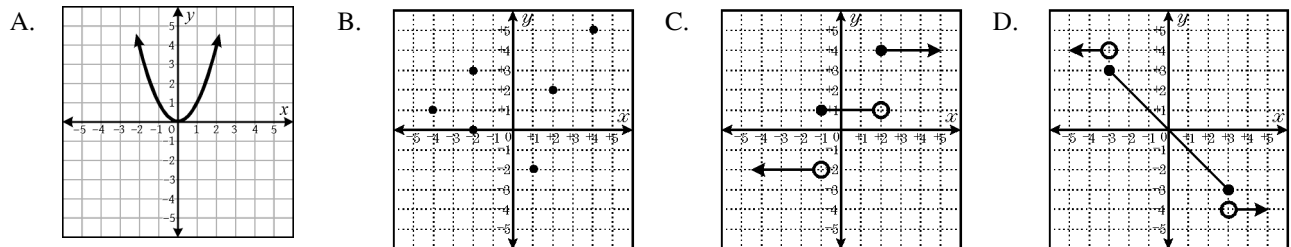
- A. (2, 2) B. (3, -2) C. (-1, 14) D. (4, -6)

20. The two line segments shown are representative of the information that Renee has a total of 12 cookies in chocolate chip and peanut butter, ($C + P = 12$), and the number of chocolate chip cookies is three times the number of peanut butter cookies, ($C = 3P$). How many of each type of cookie does she have?

- A. 3 chocolate chip and 9 peanut butter
- B. 6 chocolate chip and 6 peanut butter
- C. 9 chocolate chip and 3 peanut butter
- D. 10 chocolate chip and 2 peanut butter



21. Which of the following graphs is *not* a function?

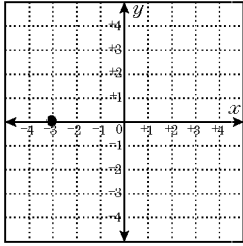


22. Determine if the relationship represents a function. Explain.

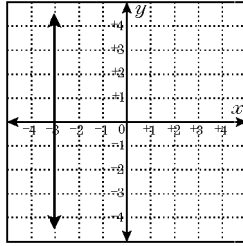
x	y
1	27
3	31
7	49
3	37

23. Which of the following is the graph of $x = -3$?

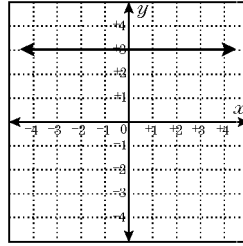
A.



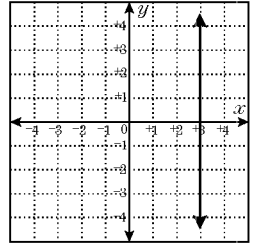
B.



C.



D.



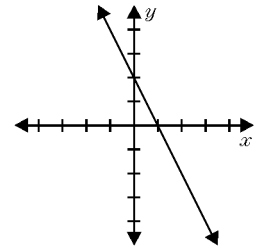
24. The given graph is represented by which equation?

A. $y = -2x + 2$

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

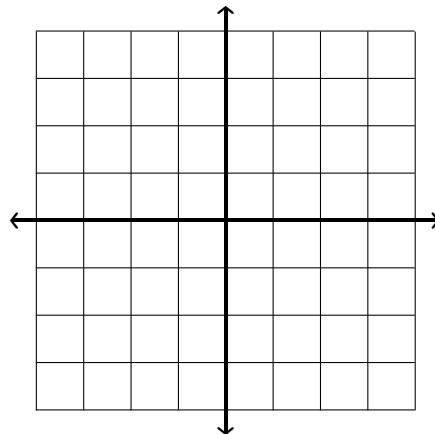
C. $y = -\frac{1}{2}x + 1$

D. $y = 2x + 2$



25. For the equation $y = x - 2$, fill the table with ordered pairs, then graph.

x	y



26. Study the functions.

Function F

A bakery has 100 cups of flour. For each batch of cookies they use 10 cups of flour. The remaining flour, F , can be represented as a function of cups used, c , by the equation $F = 100 - 10c$.

Function P

Roger planted a 18 inch tall bush. The bush grows 6 inches each month. The table shows the height of the bush, y , as a function of months, x .

x	y
0	18
1	24
2	30
3	36

Which function has a positive slope?

- A. Function F has a positive slope since its slope is 100.
- B. Function P has a positive slope since its slope is 18.
- C. Function F has a positive slope since its slope is -10 .
- D. Function P has a positive slope since its slope is 6.

27.

The fine for speeding in a certain state is determined by using the formula

$$F = 10(S - 55) + 70$$

where F is the fine in dollars and S is the speed of the vehicle in miles per hour.

- a) What is the fine for driving at a rate of 63 mph? _____
- b) Suppose you are fined \$200. How fast were you driving? _____
- c) At what speed would you receive the minimum fine of \$70? _____

In a neighboring state, the fine for speeding is determined by the formula

$$F = 4(S - 65) + 200$$

where F is the fine in dollars and S is the speed of the vehicle in miles per hour.

- d) Joseph was caught speeding in both states. Find the speed at which both fines would be equal.

28. Use the table of values shown to write a rule that describes the relationship between the variables x and y . Your rule can be explained in words or written as an algebraic expression.

x	5	10	15	20	25
y	9	19	29	39	49

29. Sketch a graph to represent the situation. Label the axes of the graph.

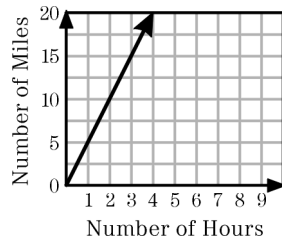
Pete leaves home and walks 6 blocks to the beach.

He stays at the beach all day.

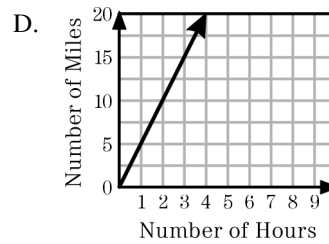
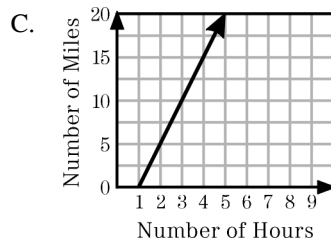
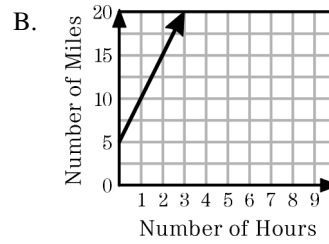
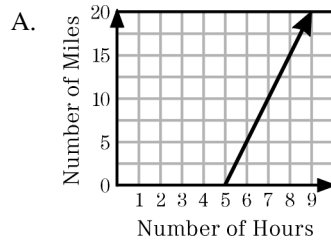
Then Pete walks 2 blocks farther than the beach to buy a soft serve ice cream cone.

Finally, Pete walks back home.

30. A runner travels at a constant rate of 5 miles per hour, as shown in the graph.

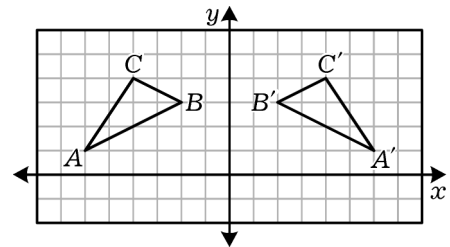


A second runner travels at the same speed but was given a 5 mile head start. Which graph below best represents the number of miles traveled by the second runner?

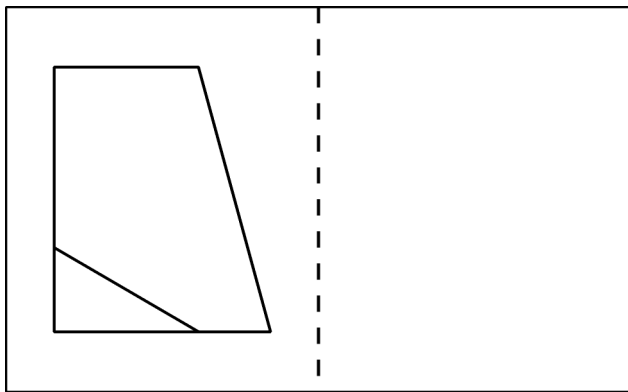


31. In the diagram, $\triangle A'B'C'$ is the image of $\triangle ABC$. Which type of transformation is shown?

- A. reflection B. rotation C. slide D. dilation

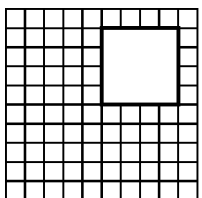


32. Draw a reflection of the figure across the dotted line.

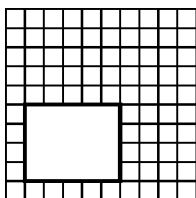


Could another transformation(s) create the reflected figure? Explain.

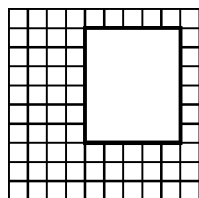
33. Four shapes are shown on the grids. Which two shapes are congruent?



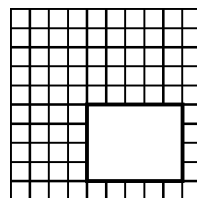
shape 1



shape 2



shape 3



shape 4

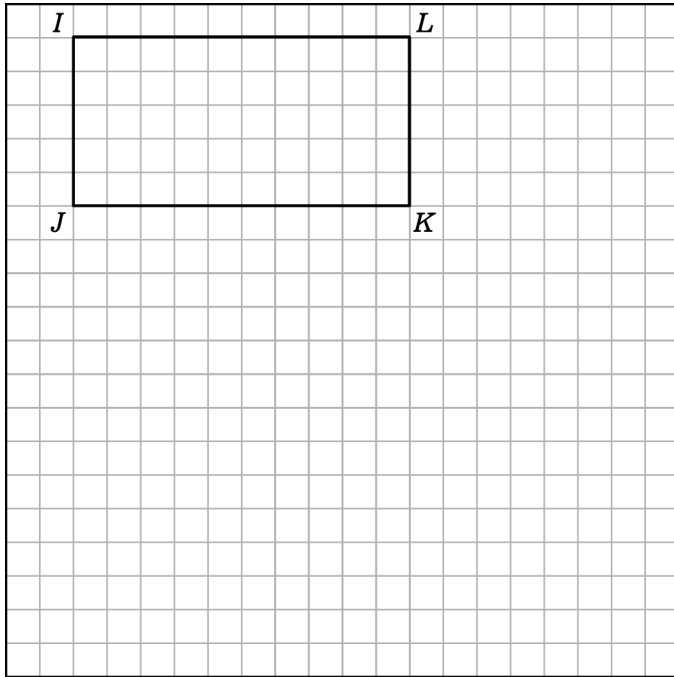
A. shapes 1 and 3

B. shapes 2 and 3

C. shapes 3 and 4

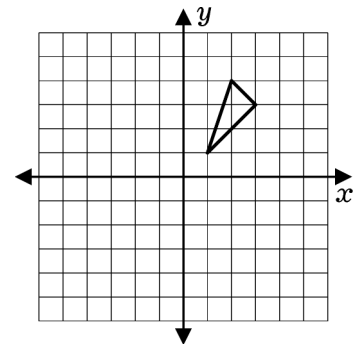
D. shapes 2 and 4

34. On the grid, draw a rectangle $MNOP$ which is congruent to rectangle $IJKL$. Then draw a rectangle $QRST$ which is similar but *not* congruent to rectangle $IJKL$. Label your rectangles. Explain why they are congruent and similar to the original.

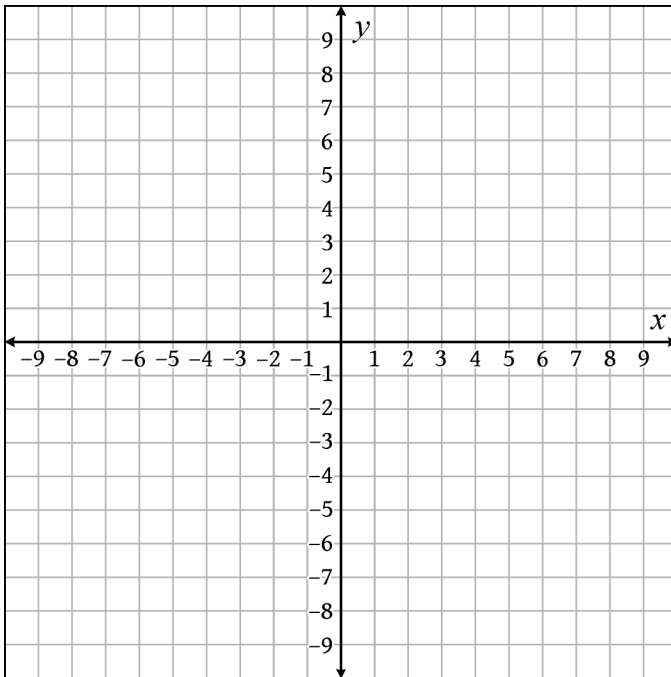


35. Refer to the figure below. If the triangle is reflected across the x -axis, the coordinates of the new vertices will be $(1, -1)$, $(3, -3)$, and _____.

- A. $(2, 4)$ B. $(-2, 4)$ C. $(2, -4)$ D. $(-2, -4)$



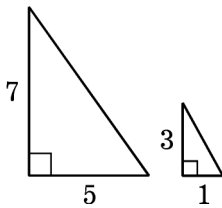
36. a) On the grid, draw the line $y = -2$.



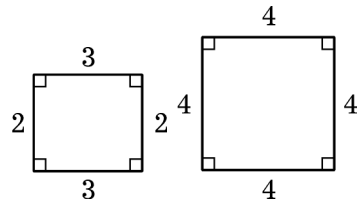
- b) Plot the point $(-4, 1)$ and label the coordinates.
 c) Reflect the point across the line $y = -2$. Label the coordinates of the reflected point.
 d) Finally, translate the second point horizontally five units in the positive direction. Label the coordinates.

37. Which pair of figures *must* be similar?

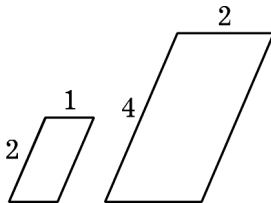
A.



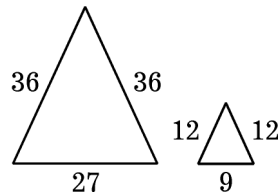
B.



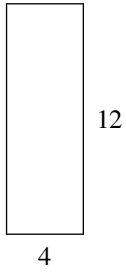
C.



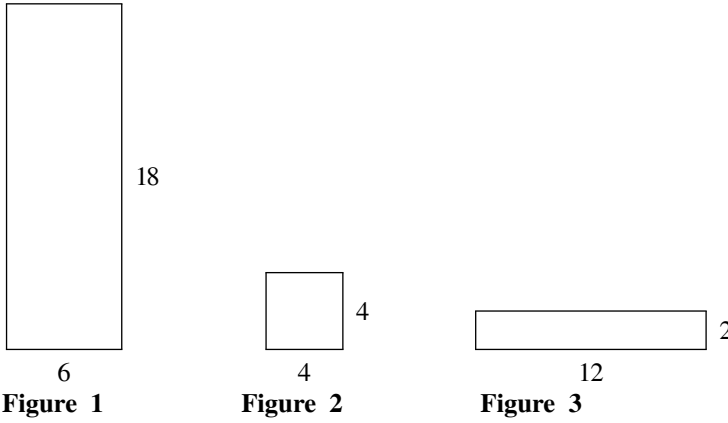
D.



38. a) Look at the rectangle.



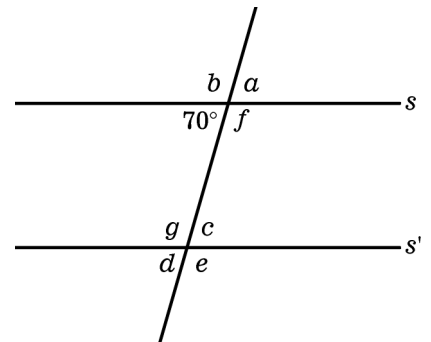
- b) Which figure is similar to the rectangle?



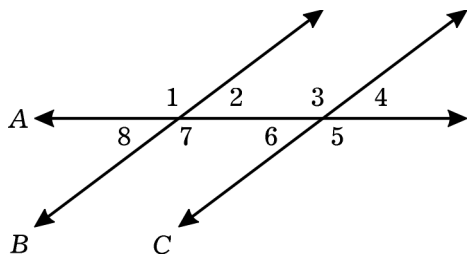
- c) What criteria did you use to determine similarity?
 d) What transformation produced the similar figure?

39. How many angles, besides the one given, measure 70° ?

- A. 2 B. 3 C. 4 D. 5



40. In the figure, lines B and C are parallel.



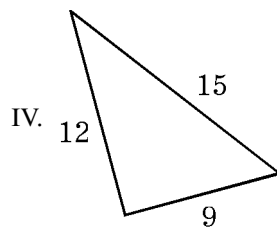
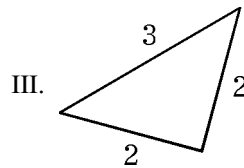
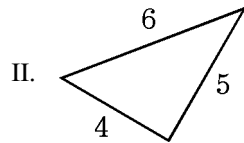
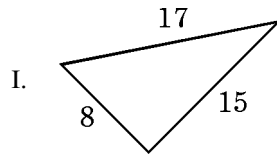
alternate interior	alternate exterior
adjacent	corresponding
supplementary	complementary

a) Use the terms in the box to label each angle pair. More than one term may apply to each angle pair.

- $\angle 1, \angle 2$
- $\angle 2, \angle 4$
- $\angle 3, \angle 5$
- $\angle 2, \angle 6$

b) If $m\angle 3 = 9x$ and $m\angle 8 = 6x$, find the measure of each numbered angle in the figure.

41. Which of the following are right triangles?



A. I only

B. III only

C. I and IV only

D. I, II and IV

42. The diagonal of a square is 12. What is the length of a side of the square? Show how you arrived at your answer.

43. Given the points $A(4,6)$ and $B(8,-2)$, what is the length of \overline{AB} ?

A. $\sqrt{5}$

B. $2\sqrt{5}$

C. $4\sqrt{5}$

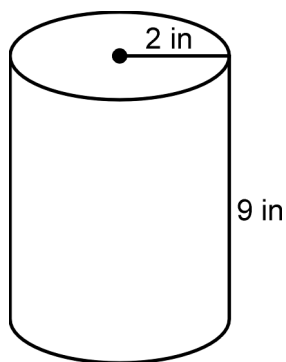
D. $4\sqrt{13}$

44. Find the exact distance between the points $A(3, -1)$ and $B(-4, -2)$.

What is the midpoint of \overline{AB}

What is the slope of \overline{AB} ?

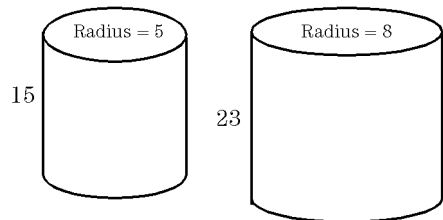
45. Cynthia opened her cylindrical container of oatmeal that has a height of 9 inches and a radius of 2 inches. The can was filled one inch below the top of the container.



Which expression can be used to find the amount of oatmeal in the container?

- A. $(4\pi \cdot 9) - 1$ B. $2\pi \cdot 8$ C. $\pi \cdot 2^2 \cdot 8$ D. $\frac{4\pi \cdot 9}{3}$

- 46.



If you fill cylinder number I with the water that is inside cylinder number II, how much water will be left in cylinder II? Show all work.

47. Which is the best description of a scatterplot?
- A. a graph of ordered pairs that come close to representing a line with a positive slope
 - B. a graph of ordered pairs used to determine if a relationship exists between two variables
 - C. a graph that shows how two different quantities change over a certain period of time.
 - D. a graph that can display more data than a line graph or histogram.

48. According to the World Health Organization (WHO), the incidence of malaria is reduced when people sleep under long-lasting insecticidal nets (LLIN). These are nets which repel, disable or kill the mosquitoes which transmit malaria. Conventional mosquito nets need to be re-treated with insecticide, while LLINs are effective without re-treatment for the life of the net.

An organization that distributes free LLINs kept track of how much inventory it had left over a 12-day period. The data is shown in the table.

Day	1	2	3	4	5	6
Inventory	1800	1725	1680	1530	1400	1300
Day	7	8	9	10	11	12
Inventory	1200	1125	1000	875	730	625

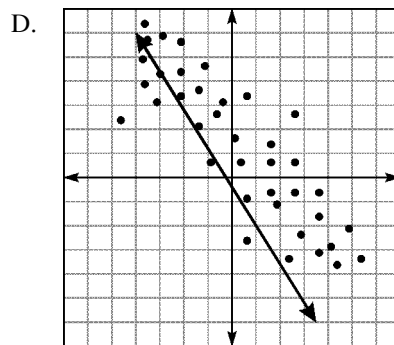
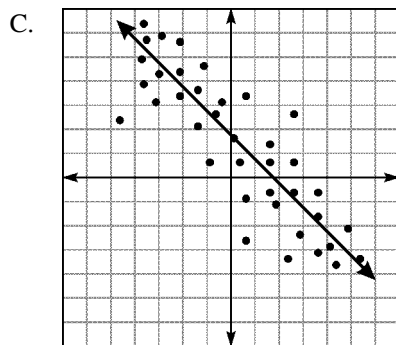
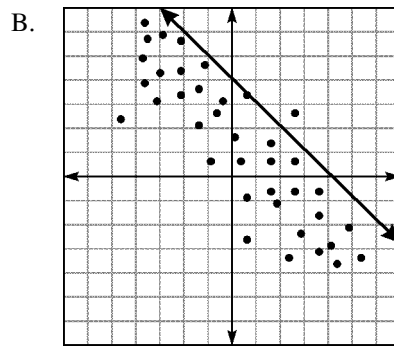
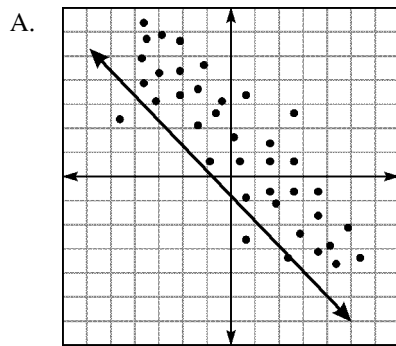
- a) Make a scatterplot of the data.
- b) Does there appear to be a relationship between the number of days and the number of nets distributed? Use the scatterplot to support your answer.
- c) After how many days do you expect all the nets to be distributed?
- d) Calculate the slope between the points (3, 1680) and (6, 1300). Use that slope to write an equation to show the relationship between the number of LLIN in inventory and the number of days. If the equation you wrote describes the data, what does the slope represent in the real world context?

49. Which of the following describe the line of best fit for a set of data points?

- I. The line should follow the tendency of the data from first to last point.
- II. There should be about as many points above the line as below the line.
- III. The points at each end are concentrated on one side of the line.
- IV. Most of the points are above the line.

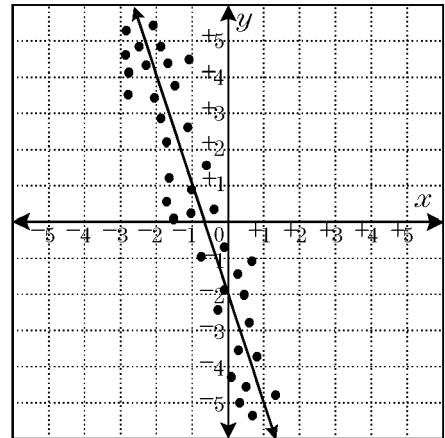
- A. I only B. I and II only C. III only D. V only

50. Which line appears to be the best fit for the data points?



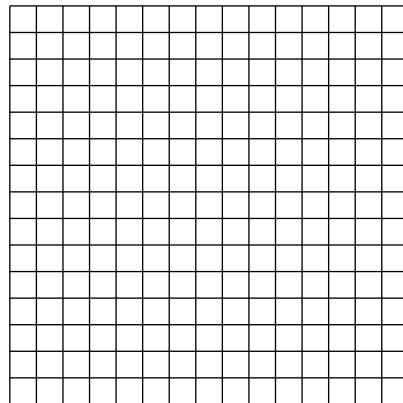
51. Shrikant was given some data and was asked to find the line of best fit for his economics class. If the graph shown is what he came up with, what is the equation of his line?

- A. $y = 3x + 1$ B. $y = \frac{1}{3}x + 1$
 C. $y = -\frac{1}{3}x - 2$ D. $y = -3x - 2$



52. The following table lists values of x and y for a function.

x	y
4	5
-2	2
0	3
2	4
-6	0
-4	1
6	6
1	3.5



- Plot the points on the coordinate grid.
- Draw a line through the points and determine the slope.
- Write the equation of the line in slope-intercept form.
- Write the equation of the line in $Ax + By = C$ form.
- Describe a situation that the graph might represent.