

# Answers

## Unit 1- Solving Equations & Inequalities

Solve each equation. SHOW YOUR WORK!

1.  $9 + t = 35$

2.  $\frac{z}{4} = \frac{1}{2}$

3.  $-2q - 5 = -11$

4.  $15 = -t + 3$

$t = 26$

$z = 2$

$q = 3$

$t = -12$

5.  $-\frac{2}{5}x + 4 = 8$

6.  $2(t + 5) = 9$

7.  $x - (4 - x) = 0$

$x = -10$

$t = -1/2$

$x = 2$

Solve each, then graph the solution.

8.  $\frac{c}{5} - 4 = -3$

9.  $7s - (3s + 1) = 4(3 + s)$

10.  $3(2t - 6) = 2(3t - 9)$

$c = 5$

no solution  
( $\emptyset$ )

all Real #s  
( $\mathbb{R}$ )



11.  $h + 3 > 2$

12.  $3m > 5m + 12$

13.  $6(c - 1) \leq -18$

$h > -1$

$m < -6$

$c \leq -2$



Solve each for the indicated variable.

14.  $A = \frac{1}{2}bh$  for  $b$

15.  $y = mx + b$  for  $b$

16.  $C = \pi r d$  for  $d$

$b = \frac{2A}{h}$

$b = y - mx$

$d = \frac{C}{\pi}$

17. The width of a rectangle is 6 cm less than the length. The perimeter is 72 cm. Write and solve an equation to find the width and the length of the rectangle.

let  $l = \text{length}$

$l + l + l - 6 + l - 6 = 72$

length = 21 cm  
width = 15 cm

18. The sum of three even integers is -198. Find the three integers.

let  $x = \text{smallest integer}$

$x + x + 2 + x + 4 = -198$

Integers: -68, -66, and -64.

19. The Great Seto Bridge in Japan is about 7.6 miles long. How long would it take you to cross the bridge if you were walking at 4 mi/h? \*proportion

$\frac{7.6 \text{ miles}}{x \text{ hours}} = \frac{4 \text{ miles}}{1 \text{ hour}}$

$x = 1.9$

1.9 hours

20. What property would justify the next step used to solve the equation,  $12x = -24$ ?

A. Subtraction Property of Equality

B. Addition Property of Equality

C. Multiplication Property of Equality

D. Division Property of Equality

21. A taxi charges a base fee of \$3.00 and \$0.15 for every mile of the ride. What equation would represent the relationship between the cost of the ride ( $c$ ) and the miles of the trip ( $m$ )?

A.  $c = 3.00m$

B.  $c = .15m$

C.  $c = 3.00m + .15$

D.  $c = .15m + 3.00$

22. Hillary works at a video store. She earns \$8.50 per hour plus 12% commission on all the weekly sales she makes. If she works 24 hours in a week, which expression best describes her sales ( $x$ ) if she earns at least \$324 during that week?

- A.  $8.5 + 0.12x \geq 324$
- B.  $204 + 0.12x \geq 324$
- C.  $8.5 + 0.12x \leq 324$
- D.  $204 + 0.12x \leq 324$

23. Your class is holding a bake sale to raise money for a field trip. If you are selling cakes for \$3.25, how many do you need to sell to make at least \$250 for your trip?

- A. 76
- B. 77
- C. 812
- D. 813

28. If a number is doubled, and 16 is added to it, the result is 40. What is the number?

- A. 28
- B. 24
- C. 14
- D. 12

29. Carson solved an inequality using the steps shown.

- Given:  $-2(n - 3) - 5 \leq 9$
- Step 1:  $-2n + 6 - 5 \leq 9$
- Step 2:  $-2n + 1 \leq 9$
- Step 3:  $-2n \leq 8$
- Step 4:  $n \leq -4$

Which step contains Carson's first mistake?

- A. Step 1
- B. Step 2
- C. Step 3
- D. Step 4

24. A taxi ride cost \$24.20. The driver charged \$4 plus \$0.30 per .5 mile traveled. Approximately how many miles did the taxi travel on this trip?

- A. 67 miles
- B. 47 miles
- C. 40.3 miles
- D. 33.7 miles

25. In order to receive a B in Biology class, Michael must have an average score of at least 82 on 5 tests. So far, he has made 88, 90, 75, and 76. What must he score on the last test to make a B in the class?

- A. at least 88
- B. at least 87
- C. at least 82
- D. at least 81

Unit 2- Functions

Find the range of each function when the domain is  $\{-4, 0, 1, 5\}$  \*Substitute values in for x

1.  $y = 4x - 7$       2.  $m = 0.5n + 3$       3.  $p = q^2 + 1$

$\{-23, -7, -3, 13\}$        $\{1, 3, -2, 5, 5\}$        $\{17, 1, 2, 26\}$

26. If an airplane travels 110 mph for 5 hours, what is the total distance traveled?

- A. 22 miles
- B. 55 miles
- C. 220 miles
- D. 550 miles

27. You want to limit your monthly phone bill to \$38. The phone company charges a base fee of \$15 per month and an additional \$0.09 a minute for each phone call.

What is the maximum number of minutes you can talk each month and still stay within your budget?

- A. 32 minutes
- B. 75 minutes
- C. 255 minutes
- D. 588 minutes

Determine whether each relation is a function.

4.

x	y
0	1
1	2
2	3
1	4

NO

5.

x	y
0	-2
2	0
-2	-4
4	2

Yes

6.

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

Yes

Write a function rule for each table of values.

7.

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

+1  
+1

x	f(x)
0	0
1	-4.5
-1	4.5
2	-9

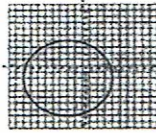
+1  
+1

$y = 2x + 1$   
 $f(x) = -4.5x$

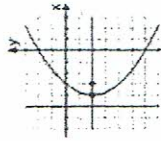
9. Which represents a function?

x	y
2	2
3	5
4	10
5	15

1.



2.



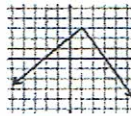
3.



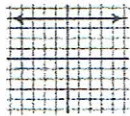
4.

- A. Both 1 and 4  
B. Both 1 and 2  
C. Only 1  
D. Only 3

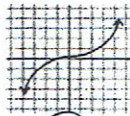
10. Which graph illustrates a function?



A.



B.



C.



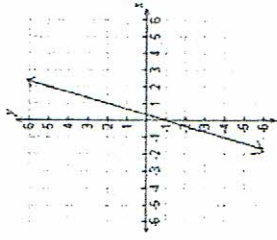
D.

11. Which equation describes the function represented by the table?

x	y
-2	9
-1	2
2	-19
3	-26

- A.  $y = x - (-11)$   
B.  $y = 4x + 6$   
C.  $y = -7x - 5$   
D.  $y = -3x + 7$

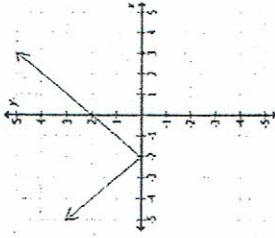
13. A linear function is graphed below.



What is  $f(2)$ ?

- A. -4  
B. -1  
C. 1  
D. 5

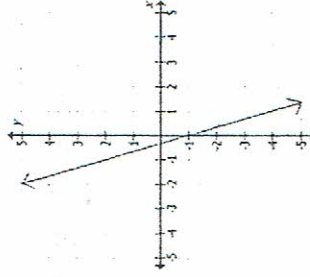
14. An absolute value function is graphed in the coordinate grid.



Which statement is true?

- A. The value of the function is 0 when  $x = 2$ .  
B. The value of the function is -4 when  $x = 2$ .  
C. The value of the function is -3 or -1 when  $x = 1$ .  
D. The value of the function is 2 when  $x = -4$  or  $x = 0$ .

15. A function is graphed in the coordinate grid.



What is the value of  $x$  when the value of the function is  $f(x) = -4$ ?

- A. -3  
B. 0  
C. 1  
D. 5

16. The table shows a relationship between  $x$  and  $y$  values.

Input ( $x$ )	Output ( $y$ )
4	16
5	19
6	22
7	25
9	31

Which equation *best* describes the rule for the  $x$  and  $y$  values in the table?

- A.  $y = 4x - 3$   
B.  $y = 3x - 4$   
C.  $y = 4x + 3$   
D.  $y = 3x + 4$

Examine the relation.

$\{(-2, -2), (-2, 4), (-1, 1), (1, 0), (1, 1), (3, 3), (3, -2)\}$

12.

Is the relation a function, and what is the range?

- A. function; range  $\{-2, -1, 1, 3\}$   
B. function; range  $\{-2, 0, 1, 3, 4\}$   
C. not a function; range  $\{-2, -1, 1, 3\}$   
D. not a function; range  $\{-2, 0, 1, 3, 4\}$

### Unit 3 - Linear Equations

Find the slope of the line that passes through each pair of points.

- (3, -2) and (-5, -4)
- (4, 5, -1) and (4, 5, 2, 6)
- (2, 5) and (-5, -2)

$$m = \frac{1}{4}$$

$$m = \text{undefined} \quad m = 1$$

- Find the x- and y- intercept for the equation:  $5x + 2y = 10$

$\downarrow$  sub 0 in for x  
 $\downarrow$  sub 0 in for y  
 x-intercept: (2, 0)  
 y-intercept: (0, 5)

Write an equation of a line that passes through the point (1, -2) with slope m.

- $m = 2$   
 $y = 2x - 4$
- $m = 3/4$   
 $y = \frac{3}{4}x - \frac{11}{4}$
- $m = 0$  ← horizontal line  
 $y = -2$

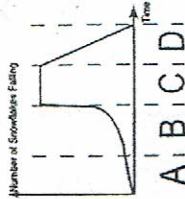
Write an equation of a line through the given points.

- (4, 3), (-2, 1)  
 $y = \frac{1}{3}x + \frac{5}{3}$
- (5, -4), (0, 2)  
 $y = -\frac{6}{5}x + 2$
- (-1, 0), (-3, -1)  
 $y = \frac{1}{2}x + \frac{1}{2}$

Write an equation for each of the following conditions.

- Parallel to  $y = 4x - 2$  through (2, -1) Same slope  
 $y = 4x - 9$
- Perpendicular to  $y = -3x + 7$  (3, 5) opposite reciprocal slopes  
 $y = \frac{1}{3}x + 4$

- Leslie used her new snowflake-counting machine to record how quickly the snow was falling during a recent storm. The snow fell at four distinct rates creating periods A, B, C and D as shown in the diagram.

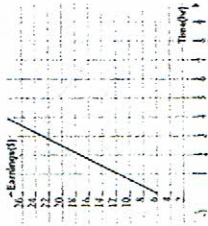


During which period did the snow fall at a rate that can be approximated by a linear function with a negative slope?

- A
- B
- C
- D

- 

Kelly charges a flat fee of \$6 for her babysitting service plus an hourly charge of \$8.20. The graph shows Kelly's earnings from babysitting.



On the graph, what does the y-intercept represent?

- number of hours of babysitting
- flat fee for babysitting
- hourly rate for babysitting
- total charges of babysitting

- Linear functions are written in the box.

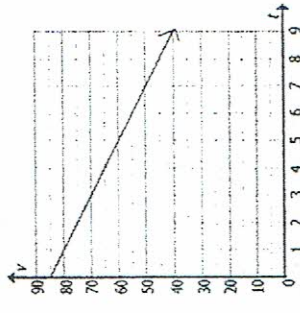
$$y = \frac{2}{3}x - 4$$

$$y = 3x + 2$$

Which statement is true about the 2 functions?

- The graph of  $y = \frac{2}{3}x - 4$  is steeper and intersects the x-axis at -4.
- The graph of  $y = \frac{2}{3}x - 4$  is steeper and intersects the y-axis at -4.
- The graph of  $y = 3x + 2$  is steeper and intersects the x-axis at 2.
- The graph of  $y = 3x + 2$  is steeper and intersects the y-axis at 2.

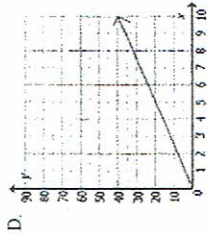
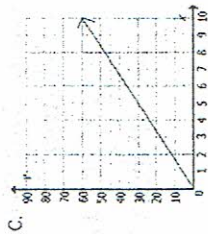
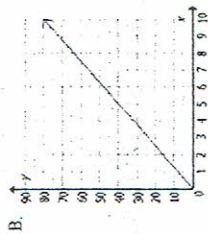
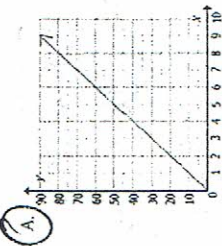
- A water tank is draining at a constant rate. A graph modelling the volume of the tank  $v$  in cubic meters as a function of the time  $t$  in seconds that the tank has been draining is shown.



At what rate is the tank draining?

- 5  $m^3$  per second
- 17  $m^3$  per second
- 34  $m^3$  per second
- 85  $m^3$  per second

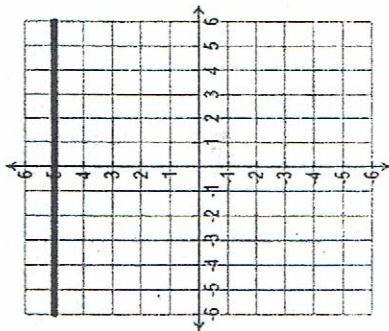
17. Maria earns \$10 per hour babysitting. Which graph models her total earnings  $y$  from  $x$  hours of babysitting?



19. Which point is a solution to the inequality  $y > -5x + 3$ ?

- A. (0, 3)  
 B. (1, 0)  
 C. (-3, 1)  
 D. (-1, -2)

18. What is the slope of the line?



- A. undefined

B. 0

C. 5

D. -5

20. The function  $f(x) = 7x + 15$  models the time in minutes that a customer will wait to get an oil change if there are  $x$  cars in line ahead of the customer. How long will a customer wait if they are the fifth car in the line?

- A. 28 minutes  
 B. 35 minutes  
 C. 43 minutes  
 D. 50 minutes

21. The cost of a class field trip is \$15 per person, plus \$50 for a bus ride. Which function can be used to find the total cost  $C(x)$  of a field trip for  $x$  students?

A.  $C(x) = 50x + 15$

B.  $C(x) = 15x + 50$

C.  $C(x) = 50x - 15$

D.  $C(x) = 15x - 50$

22. Every weekend Greg mows and rakes lawns to earn extra money. He makes \$45 for every lawn he mows and an extra \$15 for raking. His goal is to earn at least \$250 per week.

If  $m$  represents mowing, and  $n$  represents raking, which inequality models Greg's situation?

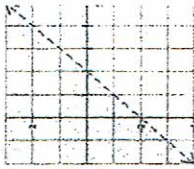
A.  $45m + 15n \leq 250$

B.  $45m + 15n \geq 250$

C.  $15m + 45n > 250$

D.  $15m + 45n < 250$

24. The graph of an inequality is shown.



Which ordered pair is a solution set for the linear inequality shown in this graph?

A. (2, 0)

B. (3, -1)

C. (0, 0)

D. (4, 2)

23. A travel agency is advertising a vacation package that includes \$250 for airfare, plus \$40 a day for a hotel. The agency also offers the option of eating breakfast and lunch at the hotel for \$10 a day for the length of the hotel stay. Which function can be used to find the total cost  $V(d)$  of staying  $d$  days and using the optional meal plan?

A.  $V(d) = 40d + 260$

B.  $V(d) = 50d + 250$

C.  $V(d) = 250d + 50$

D.  $V(d) = 260d + 40$

Unit 4- Geometry

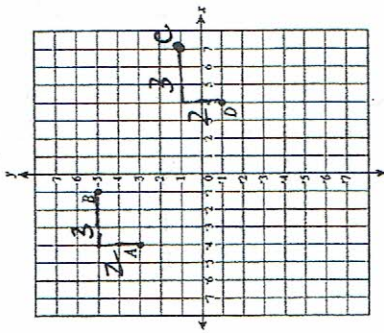
State the following:

Pythagorean Theorem  $a^2 + b^2 = c^2$

Distance Formula  $\sqrt{\frac{(x_2 - x_1)^2}{2} + \frac{(y_2 - y_1)^2}{2}}$

Midpoint Formula  $(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$

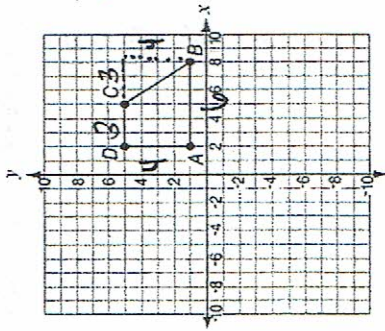
1. Three vertices of quadrilateral ABCD are A(-4, 3), B(-1, 5), and D(4, -1) as shown below.



In order for ABCD to be a parallelogram, what must be the coordinates of point C?

Point C:  $(7, 1)$

2. What is the perimeter of the quadrilateral shown in the figure below?



$\overline{CB} = 3^2 + 4^2 = c^2$   
 $9 + 16 = c^2$   
 $\sqrt{25} = \sqrt{c^2}$   
 $c = 5$   
 $P = 3 + 4 + 6 + 5$

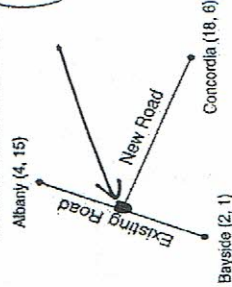
Perimeter = 18 units

3. The local planning commission has decided to build a new road from the midpoint of Albany and Bayside to the town of Concordia. If the map coordinates listed on the drawing are in miles, what is the length of the new road, in miles?

Road Construction Plans

$(\frac{4+2}{2}, \frac{15+1}{2})$   
 $= (\frac{6}{2}, \frac{16}{2})$   
 $= (3, 8)$

$d = \sqrt{(18-3)^2 + (6-8)^2}$   
 $= \sqrt{(15)^2 + (-2)^2}$   
 $= \sqrt{225 + 4}$   
 $= \sqrt{229}$



Length of the new road = 15.13 miles

4. The vertices of a quadrilateral are M(-1, 1), N(1, -2), O(5, 0), and P(3, 3). Which statement best describes Quadrilateral MNOP?

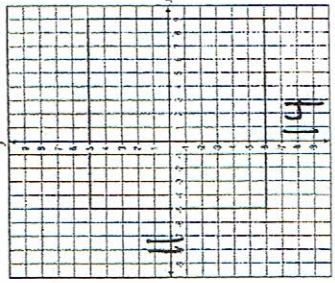
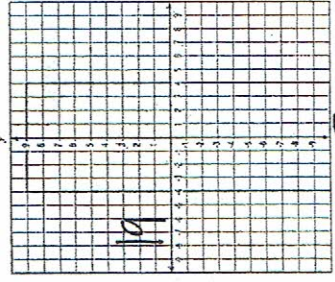
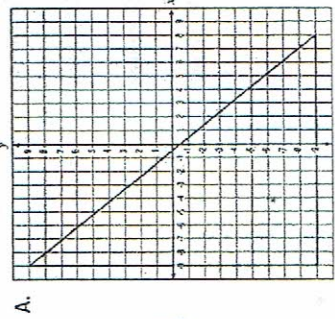
- A. Quadrilateral MNOP is a rectangle.  
 B. Quadrilateral MNOP is a trapezoid.  
 C. Quadrilateral MNOP is a rhombus, but not a square.  
 D. Quadrilateral MNOP is a parallelogram, but not a rectangle.

graph and prove using slope and distance.

5. The vertices of quadrilateral RSTU are located at R(-3, 4), S(3, 7), T(5, 3), and U(-1, 0). Which best describes quadrilateral RSTU?

- A. Square with side length  $\sqrt{20}$   
 B. Square with side length  $\sqrt{5}$   
 C. Rectangle with side lengths  $\sqrt{20}$  and  $\sqrt{5}$   
 D. Rectangle with side lengths  $\sqrt{20}$  and  $\sqrt{45}$

6. Which of the following polygons has the least (smallest) area?



18

17

8

$A = \frac{1}{2}(18)(7) = 153$

$A = (17)(8) = 152$

$A = (14)(4) = 56$

7. Rectangle  $QRST$  has two vertices at  $Q(-9, 5)$  and  $R(-7, 7)$ . If the area of rectangle  $QRST$  is 16 square units, which could be the coordinates of  $S$ ?

- A.  $(0, 0)$  B.  $(-4, 4)$  C.  $(-3, 3)$  D.  $(-2, 2)$

\*graph answer choices

8. The coordinates of the midpoint of a line segment are  $(9, -13)$ . The coordinates of an endpoint of the segment are  $(-4, 5)$ . What are the coordinates of the other endpoint?

- A.  $(-2, \frac{1}{2})$  B.  $(\frac{5}{2}, 4)$  C.  $(14, -21)$  D.  $(22, -31)$

9. A line segment has endpoints at  $(-3, -5)$  and  $(6, 1)$ . In which quadrant does the midpoint of the segment lie?  $(-\frac{3+6}{2}, \frac{-5+1}{2}) = (-\frac{3}{2}, -2)$

- A. I B. II C. III D. IV

### Unit 5 & 6- Systems of Equations & Inequalities

1. Is  $(2, 5)$  a solution of the following system?

$$\begin{cases} y = 2x + 1 \\ 2x - y = 8 \end{cases}$$

NO

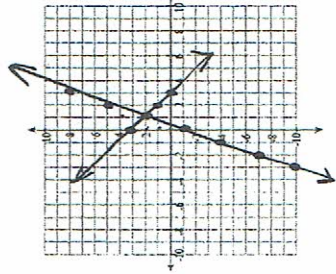
2. How many solutions does the following system have?

$$\begin{cases} y = -\frac{1}{2}x + 2 \\ 3x + 6y = 12 \end{cases}$$

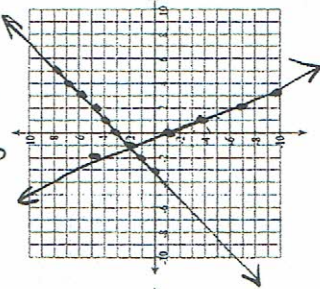
infinitely many  
(same line)

Solve each system by graphing.

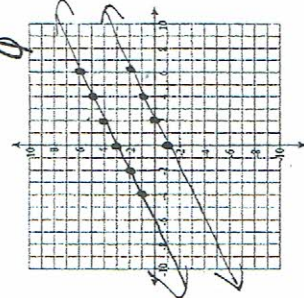
3.  $y = 3x - 1$   $(1, 2)$   
 $y = -x + 3$



4.  $x - y = -3$   $(-1, 2)$   
 $3x + y = -1$



5.  $y = \frac{1}{2}x + 3$  Solution  
 $-x + 2y = -2$  NO



Solve each system using substitution.

6.  $y = 3x + 11$   
 $y = -2x + 1$

$(-5, -4)$

8.  $y = 5x - 8$   
 $y = 2x + 6$

$(2, 2)$

Solve each system using elimination.

9.  $2x - 3y = 5$   
 $x + 2y = -1$

$(1, -1)$

10.  $3x + y = 5$   
 $4x + y = -1$

$(-6, 23)$

12. There are 24 questions on a test. Each question is worth either 4 points or 5 points. The total is 100 points. How many questions of each type are on the test?

Let:  $x = 1st?$   
 $y = 2nd?$   
$$\begin{cases} x + y = 24 \\ 4x + 5y = 100 \end{cases}$$

type of question

20 and 4

13. A farmer raises chickens and cows. There are 34 animals in all. The farmer counts 110 legs on these animals. How many of each animal does the farmer have?

Let:  $x = chickens$   
 $y = cows$   
$$\begin{cases} x + y = 34 \\ 2x + 4y = 110 \end{cases}$$

(# of each)

21 cows

13 chickens

14. Marcella and Rupert bought some party supplies. Marcella bought 3 packages of balloons and 4 packages of favors for \$14.63. Rupert bought 2 packages of balloons and 5 packages of favors for \$16.03. Find the price of a package of balloons.

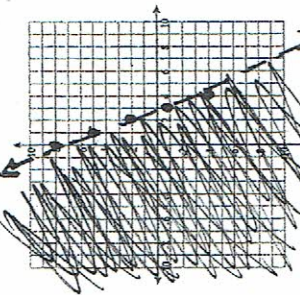
Let:  $x = balloons$   
 $y = favors$   
$$\begin{cases} 3x + 4y = 14.63 \\ 2x + 5y = 16.03 \end{cases}$$

(packages of each)

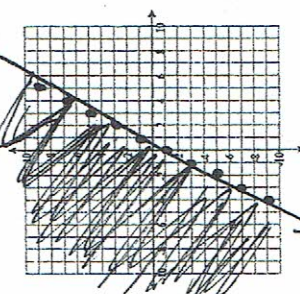
\$1.29 balloons  
\$2.69 favors

Graph each linear inequality.

15.  $y < -3x + 8$

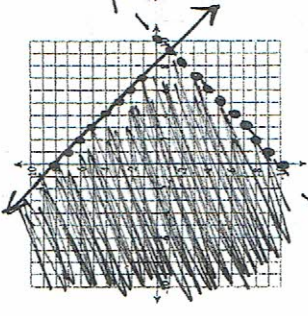


16.  $y \geq 2x - 1$

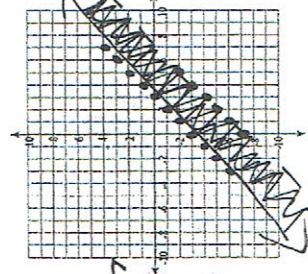


Solve each system of linear inequalities by graphing.

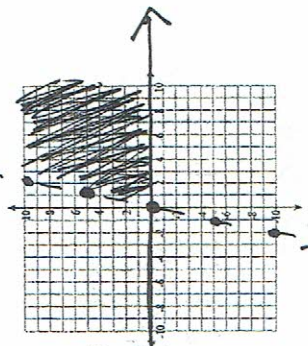
17.  $x - y < 10$   
 $x + y \leq 8$



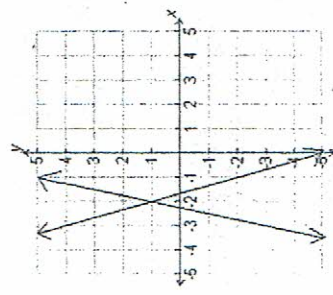
18.  $y \leq x - 3$   
 $y > x - 7$



19.  $y < 5x$   
 $y \geq 0$



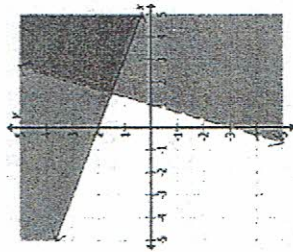
20. Below is a graph of a system of linear equations.



What is the solution of the system?

- A. (-3, 4)
- B. (-2, 1)
- C. (-1, 5)
- D. (3, 1)

21. A system of inequalities is graphed in the coordinate grid.



Which point is a solution to the system?

- A. (-3, 3)
- B. (-1, -3)
- C. (1, 0)
- D. (3, 1)

22. For homework, Randall is solving the system of linear equations in the box.

$$\begin{aligned} 3x + 4y &= 25 \\ 4x - 7y &= -16 \end{aligned}$$

Which strategy should Randall use to solve this system of equations?

- A. Solve the first equation for  $y$ , and substitute the result into the second equation. **Not the Smartest...**
- B. Multiply the first equation by 4 and the second equation by 7 to eliminate the  $y$  variable.
- C. Graph both equations on a coordinate plane to determine if the lines are parallel or perpendicular.
- D. Multiply the first and second equation by 12 to eliminate the  $x$  variable.

23. Felipe is solving this system of equations. He got (4, 7) as his solution.

$$\begin{aligned} 1.5x + 2y &= 20 \\ 2.5x - 5y &= -25 \end{aligned}$$

Is Felipe correct?

- A. No, because the solution does not check for both equations.
- B. No, because the correct solution should be (12, 11).
- C. Yes, because he distributed correctly when solving both equations.
- D. Yes, because the solution checks for both equations.

25. Study the system of equations.

$$\begin{aligned} x + 7y &\leq 14 \\ x - 2y &\leq 10 \end{aligned}$$

Which ordered pair is a solution of this system?

- A. (-1, 3)
- B. (0, 3)
- C. (1, 3)
- D. (3, 0)

24. A purse containing only nickels and dimes has 45 total coins which total \$3.75. What system of equations would model this situation?

- A.  $n + d = 45$   
 $5n + 10d = 3.75$
- B.  $n + d = 45$   
 $5n + 10d = 375$
- C.  $nd = 45$   
 $5n + 10d = 3.75$
- D.  $nd = 45$   
 $5n + 10d = 375$

*They got rid of decimals.*

26. If a solution to a linear system of equations is *no solution*, then what must be true about the graph of the system?

- A. The lines are perpendicular.
- B. The lines are parallel.
- C. The lines coincide.
- D. The lines intersect at one point.