

**No calculator unless stated.**

1. A. What is a rational number?  
A number that can be written as a fraction of integers.
- B. What is an irrational number?  
A number that can not be written as a fraction of integers.
2. Give an example of:  
A. A whole number      B. An integer      C. A rational number      D. An irrational number
- 2      -4       $\frac{3}{4}$        $\pi$
3. Name the property.
- A.  $-8+8=0$       B.  $(3 \cdot 5) \cdot 10 = 3 \cdot (5 \cdot 10)$       C.  $7 \cdot 9 = 9 \cdot 7$       D.  $12 \cdot 1 = 12$
- Additive      Assoc. Prop. of      Commutative      Multiplicative  
Inverse      Multipl.      ( $\times$ )      Identity
- E.  $(9+2)+4=9+(2+4)$       F.  $2(5+11)=2 \cdot 5+2 \cdot 11$       G.  $6 \cdot \frac{1}{6} = 1$       H.  $9+0=9$
- Associative      Distributive      Mult.      Additive  
( $+$ )           Inverse      Identity
4. What's the difference of 9 and -3?  
12
5. What's the quotient of  $\frac{1}{7}$  and  $\frac{2}{5}$ ?  
 $\frac{5}{14}$
6. Evaluate the expression for the given value.
- A.  $x^2 + 5 - x$  when  $x = -5$       B.  $-x^2 - 9$  when  $x = -4$       C.  $(3x)^2 - 7y^2$  when  $x = -3$   
 $y = 2$
- 35      -25      53
- D.  $\frac{2x+y}{3y+x}$  when  $x = 10$  and  $y = 6$       E.  $\frac{4y-x}{3(2x+y)}$  when  $x = -3$  and  $y = 3$
- $\frac{13}{14}$       -  $\frac{5}{3}$
7. Evaluate  $(-2)^5$ .      -32
8. Simplify the expression.
- A.  $14x^2 + x - 3x - 18x^2$       B.  $8(y-x) - 2(x-y)$       C.  $(x+y)^2$
- $4x^2 - 2x$       -  $10x + 10y$        $x^2 + 2xy + y^2$

9. What's the difference between an expression and an equation?

An expression is not set = to another expression or value. An equation is.

10. Solve the equation. Show your work.

A.  $4x + 7 = 27$

$x = 5$

B.  $x - 30 = 6 - 2x$

$x = 12$

C.  $2x + 11 = 15 - 6x$

$x = \frac{1}{2}$

D.  $4(-3x + 1) = -10(x - 4)$

$x = -18$

E.  $-4(3 + x) + 5 = 4(x + 3) - 14x$

$x = \frac{19}{6}$

F.  $2x + 1 = 2x - 1$

No Solution

11. Solve the equation. (you may use a calculator for C)

A.  $\left(\frac{1}{2}x - \frac{5}{3} = -\frac{1}{2}x + \frac{19}{4}\right) \cdot 12$

$x = \frac{77}{12}$

B.  $\left(\frac{2}{3}x + \frac{1}{5} = 2x - \frac{3}{10}\right) \cdot 30$

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

C.  $2.5(x - 3) + 1.7x = 10.8(x + 15)$

$x = -3.59$

12. Graph the inequality.

A.  $x \geq 4$



B.  $-4 < x \leq 4$



C.  $x \geq 4$  or  $x < -4$



13. Decide whether the number is a solution. Show why or why not.

A.  $7x - 12 < 8; 3$

$21 - 12 < 8$   
 $9 < 8$

Not a solution

B.  $-\frac{1}{3}x - 2 \leq -4; -4$

$\frac{4}{3} - 2 \leq -4$

$-\frac{2}{3} \not\leq -4$

- Not a solution

14. Solve the inequality. For part "C" you may use a calculator.

A.  $5 - 2x \geq 27$

$x \leq -11$

B.  $5 + \frac{1}{3}x \leq 6$

$x \leq 3$

C.  $4.7 - 2.1x > -7.9$

$x < 6$

D.  $5 - 5x > 4(3 - x)$

$-7 > x$

15. Solve and graph the compound inequality.

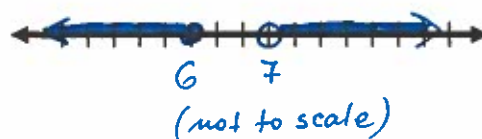
A.  $-8 < \frac{2}{3}x - 4 < 10$

$$-6 < x < 21$$



B.  $x - 1 \leq 5$  or  $x + 3 > 10$

$$x \leq 6 \text{ or } x > 7$$



16. The temperature yesterday ranged from  $72^\circ$  to  $88^\circ$ . Write the temperature as a compound inequality.

$$72^\circ \leq t \leq 88^\circ$$

17. Your sister is selling Girl Scout cookies that cost \$2.80 a box. Your family bought 6 boxes. How many more boxes of cookies must your sister sell in order to collect \$154?

Let  $b$  = boxes  
of cookies.

$$2.8(b + 6) = 154$$

$$b = 49$$

18. You want to have a bowling average of at least 205 for the three games you play tonight. On the first two games you scored 210 and 198. What is the minimum you must bowl on the third game to reach your goal?

Let  $s$  = score in  
3<sup>rd</sup> game

$$\frac{210 + 198 + s}{3} = 205$$

$$s = 207$$

19. You and a friend share the driving on a 300 mile trip. Your friend drives for 3 hours at an average speed of 52 miles per hour. How fast must you drive for the remainder of the trip if you want to reach your hotel in 3 more hours?

Let  $s$  = your speed

$$52(3) + 3s = 300$$

$$s = 48 \text{ mph}$$

20. Solve for the indicated variable.

A.  $V = LWH$ ;  $L$

$$L = \frac{V}{wH}$$

B.  $V = \frac{1}{3}bh$ ;  $h$

$$\frac{3V}{b} = h$$

C.  $4xy + y = w$ ;  $y$

$$y(4x + 1) = w$$

$$y = \frac{w}{4x + 1}$$

21. Put each equation into slope-intercept form.

A.  $2x - 3y = 12$

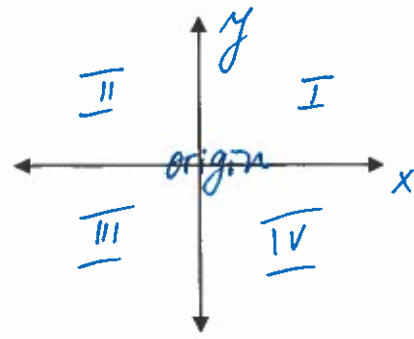
$$y = \frac{2}{3}x - 4$$

B.  $\frac{1}{3}x + \frac{1}{4}y = 6$

$$y = -\frac{4}{3}x + 24$$

22. Label the following on the coordinate plane:

Quadrants  
x-axis  
y-axis  
origin



23. Define domain: Input values of a function: abscissa.

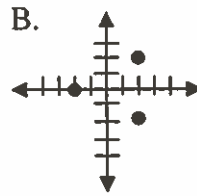
Define range: Output values of a function: ordinate.

24. Tell if each is a function. Explain your reasoning.

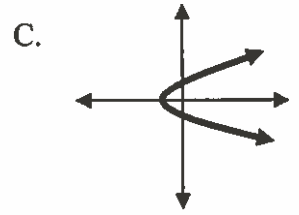
A.

x	-2	-2	0	2	2
y	1	-3	0	4	9

No, x value of (-2) has more than one y value.



No, x value of 2 has more than one y value.



No, fails vertical line test.

25. State the domain and range of each.

A.

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

Domain:  $\{-4, -3, -2, -1, 0\}$

Range:  $\{-2, -1, 0, 1, 2\}$

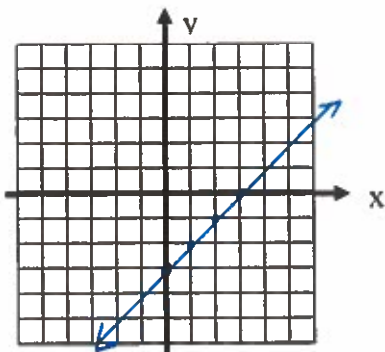
B.  $\{(-3, 23), (-2, 1), (-1, -3)\}$

Domain:  $\{-3, -2, -1\}$

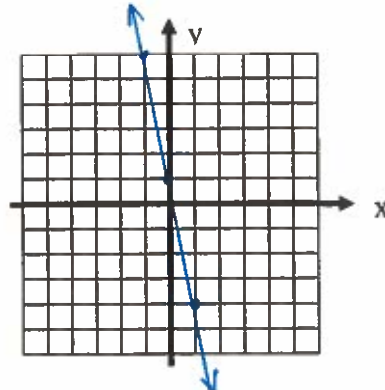
Range:  $\{23, 1, -3\}$

26. Graph each function. List three ordered pairs that are solutions for each equation.

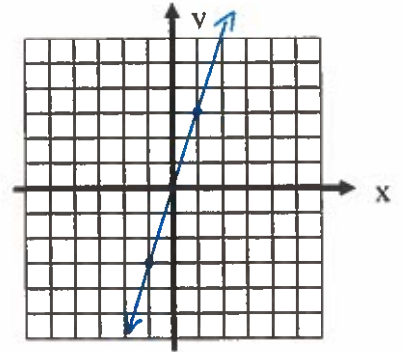
A.  $y = x - 3$



B.  $y = -5x + 1$



C.  $y = 3x$



27. Find the slope.

A. (3, 2), (-4, 3)

B. (-7, 3), (-2, 3)

C. (-9, 8), (-9, 4)

$$-\frac{1}{7}$$

$$0$$

undefined

28. Is  $f(x) = -3 + 4x$  a linear function? Explain.

Yes; The  $x$  variable has an exponent of 1.

29. Will the following lines be parallel, perpendicular, or neither? Explain.

A. Line 1: through (-2, 6) and (2, 8)  $m = \frac{1}{2}$   
Line 2: through (0, -4) and (5, -3)  $m = \frac{1}{5}$  → Neither, they have different slopes.

B. Line 1: through (4, -3) and (-8, 1)  $m = -\frac{1}{3}$   
Line 2: through (5, 11) and (8, 20)  $m = 3$  → Perpendicular, slopes are negative reciprocals.

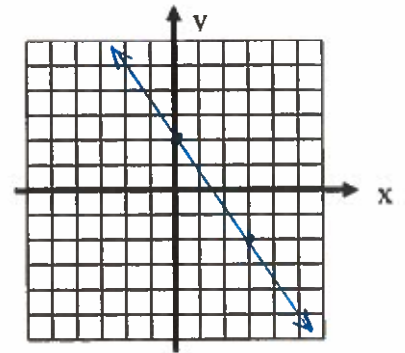
C. Line 1: through (1, 10) and (3, 7)  $m = -\frac{3}{2}$   
Line 2: through (9, 8) and (11, 5)  $m = -\frac{3}{2}$  → Parallel, slopes are the same.

30. Find  $f(3)$  if  $f(x) = 8x + 2x^2$ .

$$f(3) = 42$$

31. Put  $4x + 3y = 6$  in slope-intercept form and graph.

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



32. Sales for a firefighter's benefit dinner were \$1200. An adult's ticket cost \$6 and a child's ticket cost \$4.

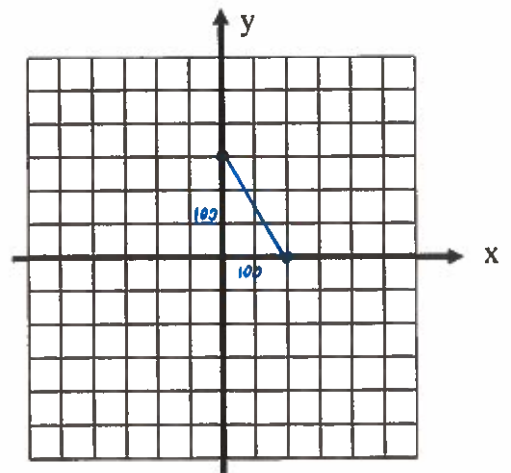
A. Write an equation in standard form to show the possible combinations of adult ( $x$ ) and children's ( $y$ ) tickets that could have been sold.

$$6x + 4y = 1200$$

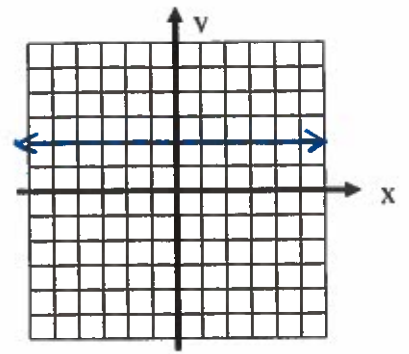
B. Give the  $x$ -intercept and  $y$ -intercept of the equation.

$$x\text{-int: } 200; \quad y\text{-int: } 300$$

C. Graph this situation.



33. Graph  $y = 2$ .



34. Find  $k$  given a line passes through  $(3, k)$  and  $(k, -1)$  and has a slope of 3.

$$\frac{-1-k}{k-3} = 3 \quad \boxed{k=2}$$

35. Find the zero of the function:

$$f(x) = \frac{1}{8}x + 2$$

$$0 = \frac{1}{8}x + 2$$

$$x = -16$$

36. Write the equation of the line in slope-intercept and standard forms, given  $m = \frac{3}{5}$  and  $b = 6$ .

$$y = \frac{3}{5}x + 6$$

$$3x - 5y = -30 \quad (\text{or } -3x + 5y = 30)$$

37. Write the equation of the line in slope-intercept form that passes through the given point and has the given slope.

A.  $(0, 2), m = 3$

$$y = 3x + 2$$

B.  $(3, -2), m = -\frac{4}{3}$

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

38. Write the equation of the line in slope-intercept form that passes through the two points.

A.  $(8, 5), (11, 4)$

$$y = -\frac{1}{3}x + \frac{23}{3}$$

B.  $(-2, 0), (0, 6)$

$$y = 3x + 6$$

39. Find the value of  $x$  so that the function  $m(x) = 9x - 5$  has the value of  $-2$ .

$$9x - 5 = -2$$

$$x = \frac{1}{3}$$

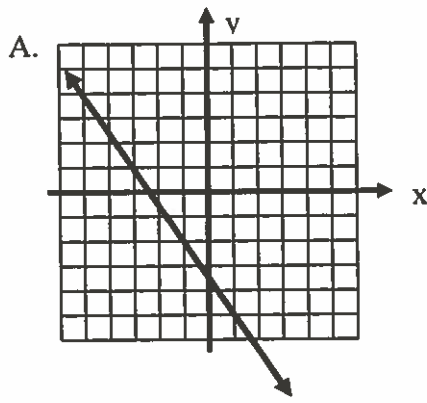
40. Write the equation of the line that passes through  $(1, -1)$  and is parallel to the line  $y = -\frac{1}{2}x + 6$ .

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

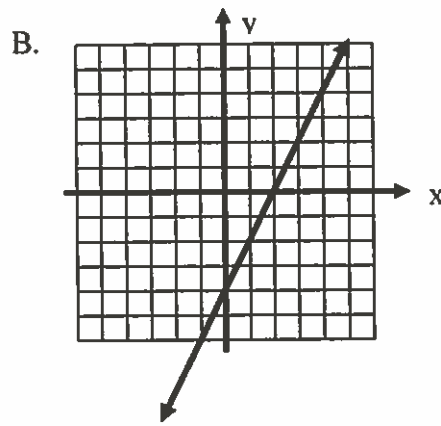
41. Write the equation of the line that passes through  $(3, -5)$  and is perpendicular to the line through  $(1, 4)$  and  $(3, -2)$ .

$$y = \frac{1}{3}x - 6$$

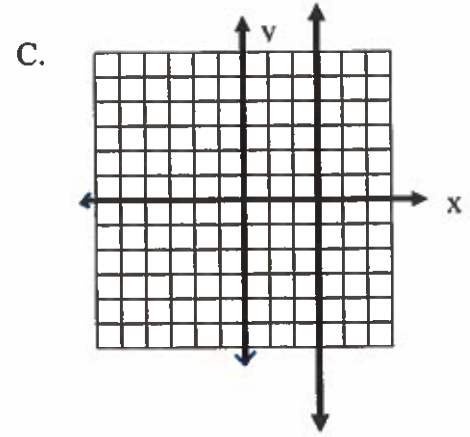
42. Write the equation of the line.



$y = -\frac{3}{2}x - \frac{7}{2}$



$y = 2x - 4$



$x = 3$

For #43 and #44 the variables  $x$  and  $y$  vary directly. Write an equation that relates the variables. Then find  $y$  when  $x = 3$ .

43.  $x = 4, y = 10$

Equation  $y = \frac{5}{2}x$

$y$  when  $x = 3$   $\frac{15}{2}$

44.  $x = 6, y = \frac{1}{2}$

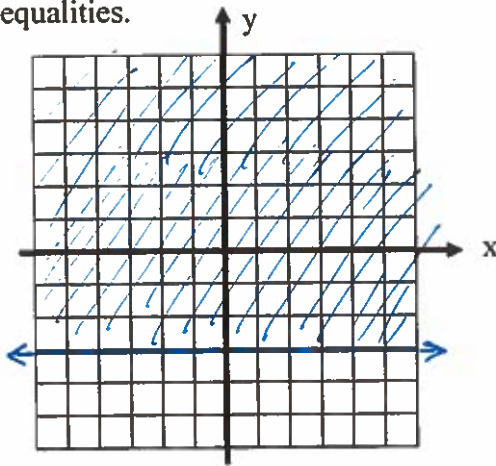
Equation  $y = \frac{1}{12}x$

$y$  when  $x = 3$   $y = \frac{1}{4}$

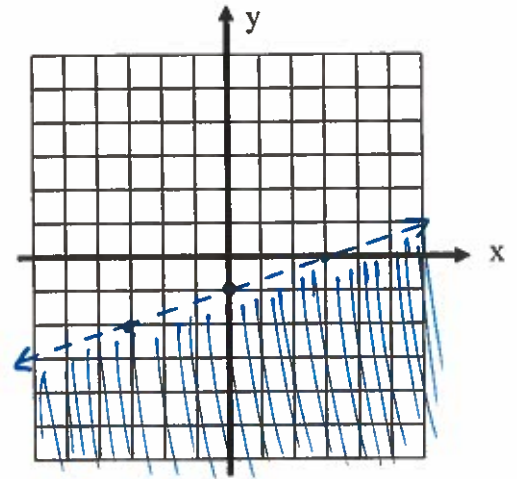
45. Graph the inequalities.

A.  $-2y \leq 6$

$y \geq -3$



B.  $y < \frac{1}{3}x - 1$



46. Is  $(2, -5)$  a solution to the system  $7x + 4y = -6$ ? Explain by showing your work.  
 $6x + 5y = -11$

No

For #47 and #48, tell if the following system represents lines that are parallel, coinciding, or intersecting. Explain how you know using slope-intercept form.

47.  $8y - 6x = -16$   $y = \frac{3}{4}x - 2$

$3x - 4y = 8$   $y = \frac{3}{4}x - 2$

Coinciding, b/c the slope and  $y$ -int. are the same.

48.  $2x + y = 13$

$x = y + 5$

$y = -2x + 13$

$y = x - 5$

Intersecting, b/c they have different slopes that are not negative reciprocals.



49. Solve the linear system represented by #48 by elimination and by substitution.

Elimination

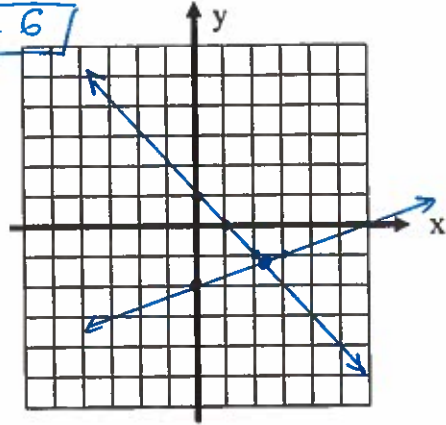
$$\begin{array}{r} 2x + y = 13 \\ x - y = 5 \\ \hline 3x = 18 \end{array}$$

$$x = 6, y = 1$$

Substitution

$$\begin{array}{r} 2(y+5) + y = 13 \\ 2y + 10 + y = 13 \\ 3y = 3 \end{array}$$

$$y = 1, x = 6$$



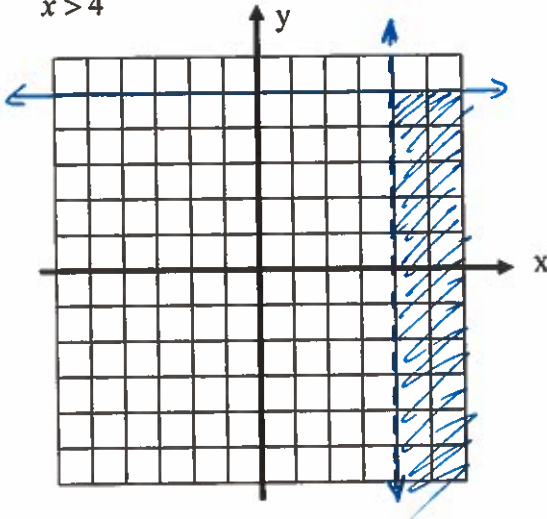
50. Solve the system by graphing:

$$\begin{array}{l} x + y = 1 \\ x - 3y = 6 \end{array}$$

$$\begin{array}{l} y = -x + 1 \\ y = \frac{1}{3}x - 2 \end{array}$$

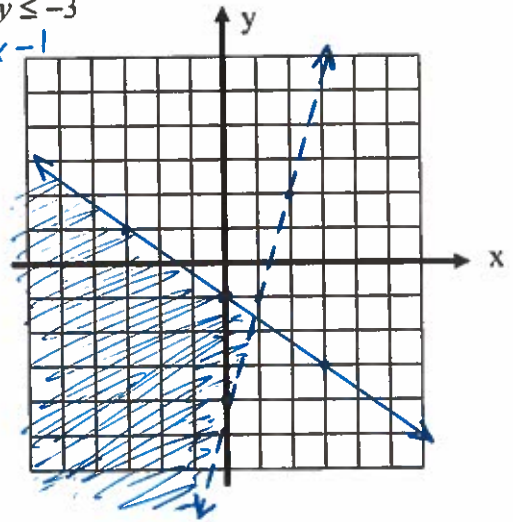
51. Solve each system of inequalities by graphing.

A.  $y \leq 5$   
 $x > 4$

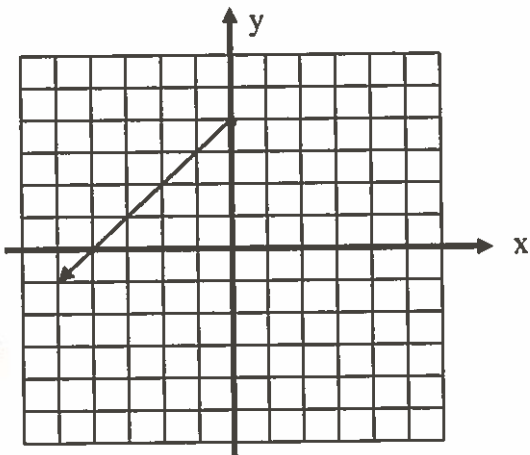


B.  $y > 3x - 4$   
 $2x + 3y \leq -3$

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



52. Analyze the following graph:



a. Function? YES NO

b. Domain:  $x \leq 0$

c. Range:  $y \leq 4$

d.  $f(-3) =$  1

e. What is x if  $f(x) = 4$ ?  $x = 0$

f. Equation  $y = x + 4$

g. Zeros of the function?  $-4$   
 $f(-4) = 0$