

Solve the equation. Justify each step.

1. $\frac{z}{4} = 12 \cdot 4$

$z = 48$

Solve the equation. Determine whether the equation has one solution, no solution, or infinitely many solutions.

2. $\left(\frac{3}{2}b\right) + 6 + \left(\frac{1}{2}b\right) = 15 + 2b$

$\textcircled{2} \quad \begin{array}{r} 1b + 6 = 15 + 2b \\ -1b \quad -15 \quad -15 \quad -1b \\ \hline -9 = b \end{array}$

$\textcircled{2} \quad b = -9$
 $\textcircled{3} \quad x = 3$

3. $4x + 8 + 6x - 5 = 33$

4. $\begin{array}{r} -7 + 4y = 39 \\ -7 \quad -7 \\ \hline 4y = 32 \\ \frac{4y}{4} = \frac{32}{4} \\ y = 8 \end{array}$

$\textcircled{3} \quad \begin{array}{r} 4x + 8 + 6x - 5 = 33 \\ 10x + 3 = 33 \\ -3 \quad -3 \\ \hline 10x = 30 \\ \frac{10x}{10} = \frac{30}{10} \\ x = 3 \end{array}$

$\textcircled{4} \quad y = 8$

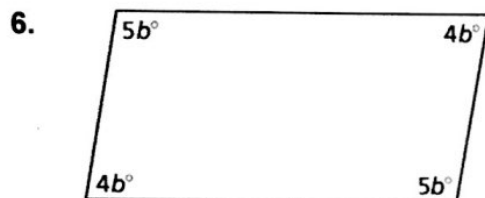
Describe the values of c for which the equation has no solution.

5. $|x + 8| = c$

ANY NEGATIVE NUMBER

$\frac{10x}{10} = \frac{30}{10}$
 $x = 3$

Find the value of the variable. Then find the angle measures of the polygon



$5b + 4b + 5b + 4b = 360$
 $18b = 360$
 $\frac{18b}{18} = \frac{360}{18}$
 $b = 20$

$b = 20$
 $5b = 100$
 $4b = 80$

Sum of angle measures: 360°

+

Solve the equation.

7. $\frac{1}{2}(6x + 4) = 5(2x - 8)$
 $\begin{array}{r} 3x + 2 = 10x - 40 \\ -3x \quad -3x \\ \hline 2 = 7x - 40 \\ +40 \quad +40 \\ \hline 42 = 7x \\ \frac{42}{7} = \frac{7x}{7} \\ 6 = x \end{array}$

8. $|b - 12| = 15$

9. $|2k + 6| = |k|$

$\textcircled{8} \quad \text{CASE 1} \quad \text{CASE 2}$

$\begin{array}{r} b - 12 = 15 \\ +12 \quad +12 \\ \hline b = 27 \end{array}$

$\begin{array}{r} b - 12 = -15 \\ +12 \quad +12 \\ \hline b = -3 \end{array}$

$\textcircled{9} \quad \begin{array}{r} 2k + 6 = k \\ -k \quad -k \\ \hline k + 6 = 0 \\ -6 \quad -6 \\ \hline k = -6 \end{array}$

$\begin{array}{r} 2k + 6 = -k \\ +k \quad +k \\ \hline 3k + 6 = 0 \\ -6 \quad -6 \\ \hline 3k = -6 \\ \frac{3k}{3} = \frac{-6}{3} \\ k = -2 \end{array}$

Solve the literal equation for y .

10. $2x + 5y = (3y) + 8$
 $\begin{array}{r} 2x + 5y = 3y + 8 \\ -3y \quad -3y \\ \hline 2x + 2y = 8 \end{array}$

Solve

$\begin{array}{r} 2x + 2y = 8 \\ -2x \quad -2x \\ \hline 2y = 8 - 2x \\ \frac{2y}{2} = \frac{8 - 2x}{2} \\ y = 4 - x \end{array}$

11. The formula for the volume of a cylinder is $V = \pi r^2 h$.

a. Solve the formula for the height h .

$\frac{V}{\pi r^2} = \frac{\pi r^2 h}{\pi r^2}$
 $\frac{V}{\pi r^2} = h$

b. A cylinder has a volume of 628 cubic inches and a radius of 10 inches. What is the height of the cylinder rounded to the nearest inch?

$\frac{V}{\pi r^2} = h$
 $\frac{628}{\pi(10)^2} = \frac{628}{3.14(100)} = \frac{628}{314} = \textcircled{2}$

12. The measures of two angles of a triangle are each four times the measure of the third angle. What is the measure of the third angle?

third angle = a

$\frac{4a}{\text{first}} + \frac{4a}{\text{second}} + \frac{a}{\text{third}} = 180$

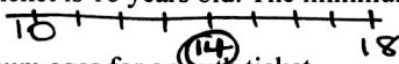
$\frac{9a}{9} = \frac{180}{9}$
 $a = 20$

13. At a book fair, a tote bag costs \$5 and books cost \$3.50 each. You spend a total of \$19 before taxes. How many books did you buy in addition to the tote bag?

$$19 - 5 = 14 \div 3.50 = 4$$

means 1

14. For a school play, the maximum age for a youth ticket is 18 years old. The minimum age is 10 years old. Write an absolute value equation for which the two solutions are the minimum and maximum ages for a youth ticket.



$$x - 14 = 4$$

middle varies

15. Your business needs to print brochures. You call two different print shops about prices. Each print shop charges a set-up fee for preparing the brochure and a price per brochure.

- a. The total cost is the same for each company. How many brochures is your business printing?

50

	Brochure set-up fee	Price per brochure
Company A	\$50	\$1.50
Company B	\$75	\$1.00

$$50 + 1.50b$$

$$75 + 1.00b$$

- b. You decide to increase the number of brochures. From which company should you order?

more than 50

$$A \rightarrow 50 + 1.50(60) = 50 + 90 = 140$$

$$B \rightarrow 75 + 1.00(60) = 75 + 60 = 135$$

↑ CHEAPER

$$\begin{array}{r} 50 + 1.50b = 75 + 1.00b \\ -1.00b \quad -1.00b \\ \hline 50 + 0.50b = 75 \\ -50 \quad -50 \\ \hline 0.50b = 25 \\ 0.50 \quad 0.50 \\ \hline b = 50 \end{array}$$

Write the sentence as an inequality.

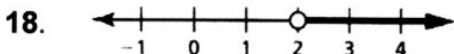
16. The sum of twice a number n and 8 is at most 25.

$$2n + 8 \leq 25$$

17. The temperature t is at least 75°F .

$$t \geq 75$$

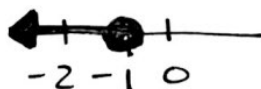
Write an inequality that represents the graph



$$x > 2$$

Solve the inequality. Graph the solution.

$$19. \frac{-3z}{-3z} \geq \frac{6 + 3z}{-3z} \quad -\frac{6z}{-6} \geq \frac{6}{-6} \quad z \leq -1$$



Solve the inequality.

$$20. 10 - 2(3x - 1) > 6x + 10$$

$$10 - 6x + 2 > 6x + 10$$

$$+6x \quad +6x$$

$$22. \frac{x}{4} + 6 \leq x + 8$$

$$24. 32 > 16 - 4g > 12$$

$$21. \frac{m}{-5m} \geq \frac{5m - 4}{-5m - 4} \quad -\frac{4m}{-4} \geq \frac{-4}{-4} \quad m \leq 1$$

$$23. 2a + 1 < 11 \text{ or } a < 3a - 12$$

$$\frac{1}{6} > x$$

$$22. \frac{1x}{4} + 6 \leq 1x + 8$$

$$-\frac{1x}{4} \quad -\frac{1x}{4}$$

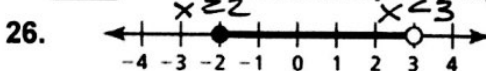
$$6 \leq \frac{3}{4}x + 8$$

$$-8 \quad -8$$

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

$$-\frac{8}{3} \leq x$$

Write and graph a compound inequality that represents the numbers that are NOT solutions of the inequality represented by the graph shown.



DO OPPOSITE

$$x \leq -2 \text{ or } x > 3$$

27. You need to write an essay that has at least 500 words. You have written 285 words so far. Write and solve an inequality that represents the number of words w that you have left to write.

$$x + 285 \geq 500$$

$$-285 \quad -285$$

$$x \geq 215$$

WRITE SOLVE

28. You need at least 30 cubic feet of sand to fill a sand box. Each bag contains 2.5 cubic feet of sand. Write and solve an inequality that represents the number of bags b that you need to buy.

$$2.5b \geq 30$$

$$b \geq 12$$

29. You are planning a school carnival. The equipment costs \$180 to rent. You plan to charge \$4.00 per ticket. You would like to have a profit of at least \$500. Write and solve an inequality that represents the number of tickets t that you need to sell.

$$4t - 180 \geq 500$$

$$4t \geq 680$$

$$t \geq 170$$

30. You want to purchase a calculator for at most \$115. You have saved \$30 so far. You earn \$7.50 per hour at your job. Write and solve an inequality that represents the number of hours h that you need to work.

$$30 + 7.50h \leq 115$$

$$7.50h \leq 85$$

$$h \leq 11\frac{1}{3} \text{ hrs.}$$

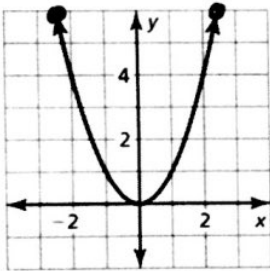
Determine whether the relation is a function. If the relation is a function, determine whether the function is *linear* or *nonlinear*.

31. $\frac{5}{x} + y = -7$ NOT FUNCTION

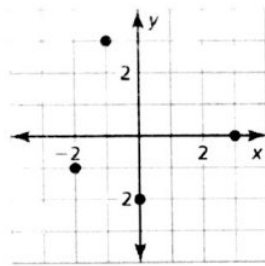
32. $2x - 5y = 10$ FUNCTION & LINEAR

Find the domain and range of the function represented by the graph. Determine whether the domain is *discrete* or *continuous*.

33. continuous



domain
 $-2.5 \leq x \leq 2.5$
range
 $0 \leq y \leq 6$



discrete

domain
 $\{-2, -1, 0, 1, 2\}$
range
 $\{0, 1, 2\}$

Evaluate the function when $x = -1, 0$, and 4 .

35. $h(x) = |-x + 5|$

$$| -(-1) + 5 |$$

$$| 1 + 5 |$$

$$| 6 |$$

$$| -(0) + 5 |$$

$$| 0 + 5 |$$

$$| 5 |$$

$$| -(4) + 5 |$$

$$| -4 + 5 |$$

$$| 1 |$$

$$\boxed{6 \quad 5 \quad 1}$$

Find the x- and y-intercepts of the graph of the linear equation

36. $2x + 3y = 6$

$$\begin{array}{c|c} x & y \\ \hline 0 & 2 \\ 3 & 0 \end{array}$$

$$3y = 6$$

$$y = 2$$

$$2x = 6$$

$$x = 3$$

37. $\frac{1}{2}x + y = -8$

(37)

$$\begin{array}{c|c} x & y \\ \hline 0 & -8 \\ -16 & 0 \end{array}$$

$$y = -8$$

$$\frac{1}{2}x = -8$$

$$x = -16$$

The points represented by the table lie on a line. Find the slope of the line.

38.

x	-5	-3	-1	1
y	7	4	1	-2

$$\frac{4-7}{-3-(-5)} = \frac{-3}{2} = -\frac{3}{2}$$

39.

x	2	2	2	2
y	-6	3	-7	1

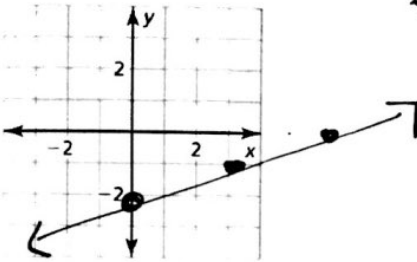
$$\frac{3-(-6)}{2-2} = \frac{9}{0}$$

$$\frac{\text{anything}}{0} = \text{undefined}$$

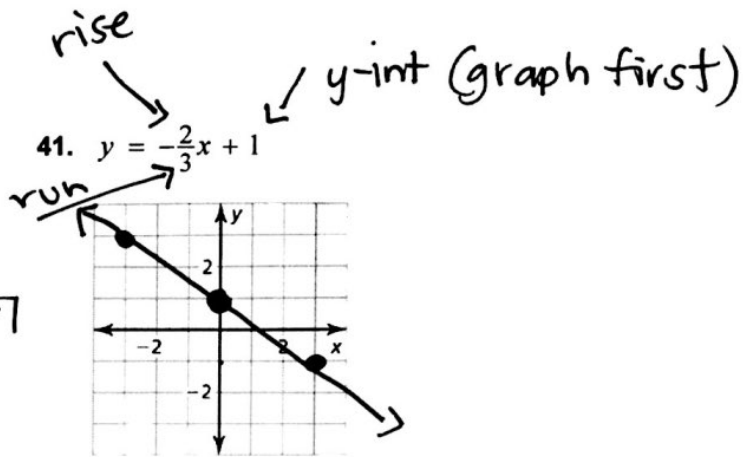
Graph the linear equation.

40. $x - 3y = 6$

$$\begin{array}{r|l} x & y \\ 0 & -2 \\ 6 & 0 \end{array}$$



41. $y = -\frac{2}{3}x + 1$



Identify the slope, y-intercept, and x-intercept of the graph of the linear equation.

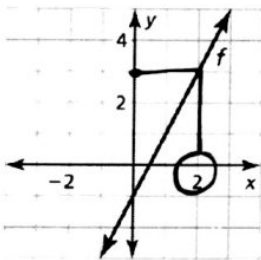
42. $5x + 3y = 15$

43. $y = x - 3$

45. $x = -4$

Find the value of x so that $f(x) = 3$.

45.



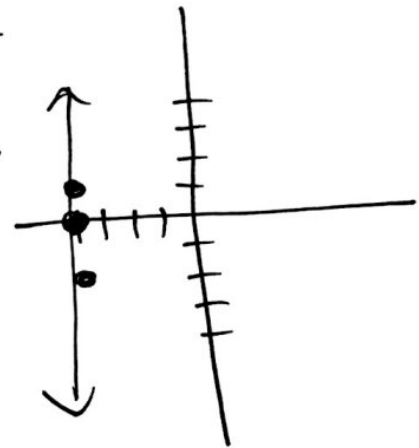
(42) $\begin{array}{r|l} x & y \\ 0 & 5 \\ 3 & 0 \end{array}$ ← y-int
← x-int

$$\begin{array}{rcl} 5x + 3y & = & 15 \\ -5x & & -5x \\ \hline 3y & = & -5x + 15 \\ \frac{3y}{3} & = & \frac{-5x + 15}{3} \\ y & = & -\frac{5}{3}x + 5 \end{array}$$

(43) $y = \frac{1}{1}x - 3$
↑ slope ↑ y-int

$$\begin{array}{rcl} 0 & = & x - 3 \\ +3 & & +3 \\ \hline 3 & = & x \\ & \text{x-int} & \end{array}$$

(45) $\begin{array}{r|l} x & y \\ -4 & 0 \\ -4 & 1 \\ -4 & -2 \end{array}$



vertical line
slope: undefined
y-int: none
x-int: -4