

Key

# Solving Linear Equations and Inequalities Review

Solve each equation.

1.  $2(7 + 5y) - 3y = -35$

$$14 + 10y - 3y = -35$$

$$14 + 7y = -35$$

$$7y = -49$$

$$y = -7$$

2.  $7x + 5 = 12x - 10$

$$7x + 10 = -7x + 10$$

$$15 = 5x$$

$$3 = x$$

3.  $-1 = \frac{5+x}{6}$

$$-6 = 5+x$$

$$-11 = x$$

Solve each inequality. Describe the solution set using interval notation. Then graph the solution set on a number line.

4.  $4x - 6 < 18$

$$+6 \quad +6$$
$$\frac{4x}{4} < \frac{24}{4}$$

$$x < 6$$

5.  $-x < -x + 7(x - 2)$

$$-x < -x + 7x - 14$$

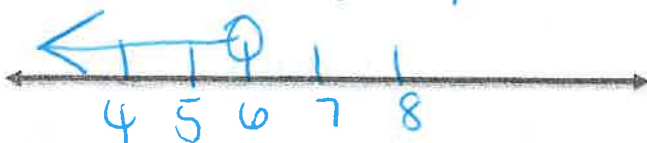
$$-x < 6x - 14$$

$$-6x \quad -6x$$

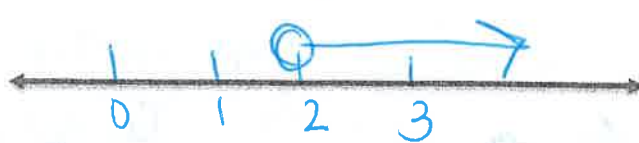
$$-7x < -14$$

$$x > 2$$

Interval Notation  $(-\infty, 6)$



Interval Notation  $(2, \infty)$



Solve each absolute value equation.

6.  $4|n + 8| = 56$

$$|n + 8| = 14$$

$$n + 8 = 14$$

$$n = 6$$

$$n + 8 = -14$$

$$n = -22$$

7.  $2|x + 4| + 3 = 9$

$$2|x + 4| = 6$$

$$|x + 4| = 3$$

$$x + 4 = 3$$

$$x = -1$$

$$x + 4 = -3$$

$$x = -7$$

Solve each inequality. Describe the solution set using interval notation. Then, graph the solution set on a number line.

8.  $-10b + 3 \leq -37$  or  $3b - 10 \leq -25$

$$\begin{array}{r} -3 \quad -3 \\ -10b \leq -40 \\ \boxed{b \geq 4} \end{array} \quad \text{or} \quad \begin{array}{r} +10 \quad +10 \\ 3b \leq -15 \\ \boxed{b \leq -5} \end{array}$$

9.  $-50 < 7k + 6 < -8$

$$\begin{array}{r} -6 \quad -6 \quad -6 \\ -50 < 7k < -14 \\ -8 < k < -2 \\ k > -8 \text{ \& } k < -2 \end{array}$$

Interval Notation  $(-\infty, -5] \cup [4, \infty)$

Interval Notation  $(-8, -2)$



Solve each absolute value inequality. Describe the solution set using interval notation. Then, graph the solution set on a number line.

10.  $|7x + 4| \geq 74$

$$\begin{array}{l} 7x + 4 \geq 74 \text{ or } 7x + 4 \leq -74 \\ 7x \geq 70 \qquad 7x \leq -78 \\ x \geq 10 \quad \text{or} \quad x \leq -11.1 \end{array}$$

11.  $|x + 5| < 9$

$$\begin{array}{l} x + 5 < 9 \quad x + 5 > -9 \\ x < 4 \quad \& \quad x > -14 \end{array}$$

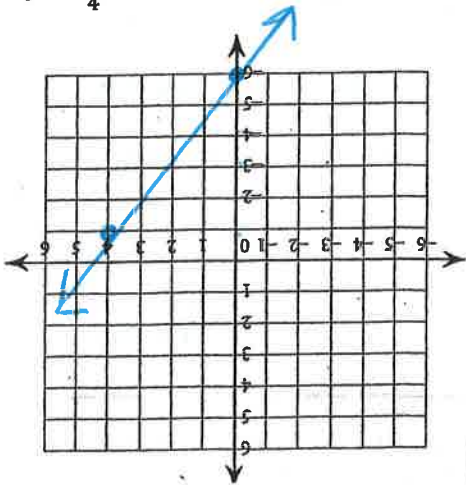
Interval Notation  $(-\infty, -11.1] \cup [10, \infty)$

Interval Notation  $(-14, 4)$

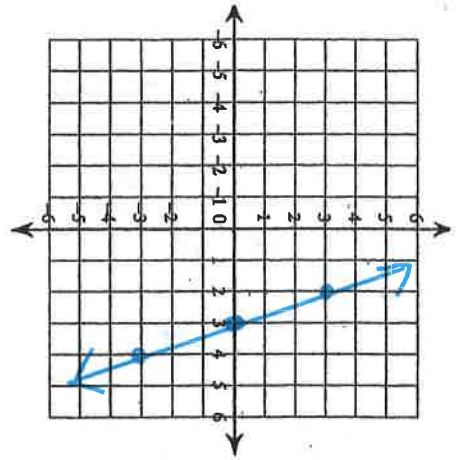


Sketch the graph of each line.

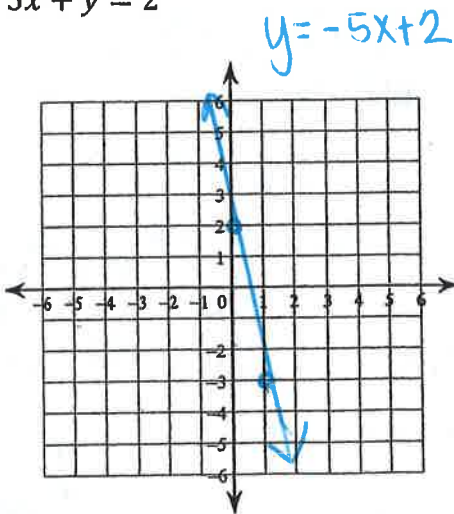
12.  $y = \frac{5}{4}x + 6$



13.  $y = \frac{1}{3}x - 3$

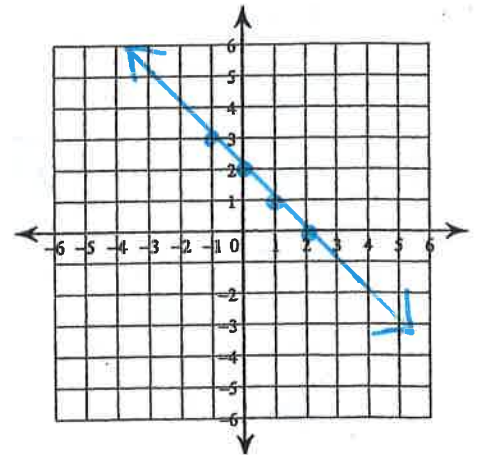


14.  $5x + y = 2$

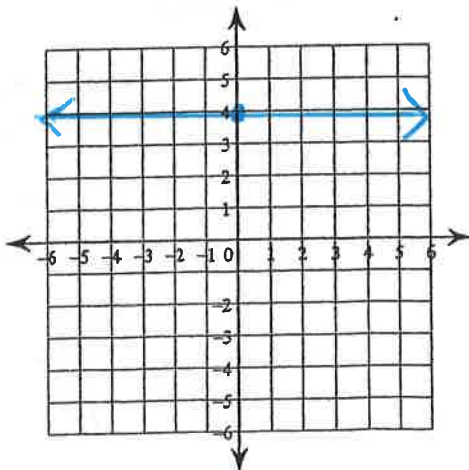


15.  $x + y = 2$

$y = -x + 2$

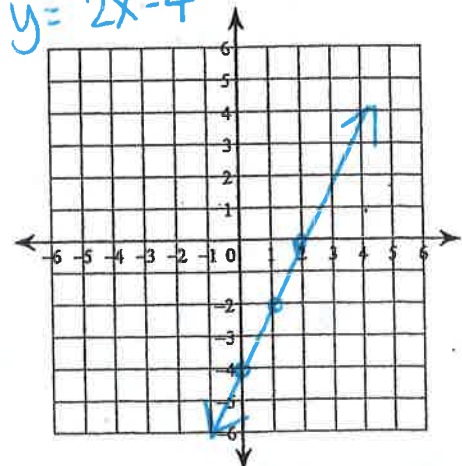


16.  $y = 4$



17.  $2x - y = 4$

$-y = -2x + 4$   
 $y = 2x - 4$



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

18.  $m = \frac{1}{4}$  through  $(-4, 2)$

$$2 = \frac{1}{4}(-4) + b$$

$$2 = -1 + b$$

$$3 = b$$

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

19.  $m = -3$  through  $(2, -5)$

$$-5 = -3(2) + b$$

$$-5 = -6 + b$$

$$1 = b$$

$$y = -3x + 1$$

Write the slope-intercept form of the line that passes through each pair of points.

20.  $(2, 3)$  and  $(4, -2)$

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

$$3 = -\frac{5}{2}(2) + b$$

$$3 = -5 + b$$

$$b = 8$$

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

21.  $(8, 10)$  and  $(14, 13)$

$$\frac{10 - 13}{8 - 14} = \frac{-3}{-6} = \frac{1}{2}$$

$$10 = \frac{1}{2}(8) + b$$

$$10 = 4 + b$$

$$6 = b$$

$$y = \frac{1}{2}x + 6$$

Write the slope-intercept form of an equation that passes through the points and is **parallel** to the graph of each equation.

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

$$m = -3$$

$$3 = -3(-1) + b$$

$$3 = 3 + b$$

$$0 = b$$

$$y = -3x$$

23. through  $(4, 8)$ ,  $6x + y = 2$

$$y = -6x + 2$$

$$m = -6$$

$$8 = -6(4) + b$$

$$8 = -24 + b$$

$$32 = b$$

$$y = -6x + 32$$

Write the slope-intercept form of an equation that passes through the point and is **perpendicular** to the graph of each equation.

24.  $(2, 5)$ ,  $3x + 5y = 7$

$$5y = -3x + 7$$

$$y = -\frac{3}{5}x + \frac{7}{5}$$

$$m = \frac{5}{3}$$

$$5 = \frac{5}{3}(2) + b$$

$$5 = \frac{10}{3} + b$$

$$\frac{5}{3} = b$$

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

25.  $(0, -4)$ ,  $6x - 3y = 5$

$$-3y = -6x + 5$$

$$y = 2x - \frac{5}{3}$$

$$m = -\frac{1}{2}$$

$$y = -\frac{1}{2}x - 4$$