

Name: Key

Period: _____

Check all your work using the answers on Mrs. Dunphy's web site. Write your score here: _____**Section 2-1: Single-sided inequalities**

Solve each inequality algebraically. Write your answer in proper set notation. Graph the solution on the number line provided.

① $-1 \leq 2n + 4 - 5$

$$\begin{array}{r} -1 \leq 2n - 1 \\ +1 \quad +1 \\ \hline 0 \leq 2n \\ 0 \leq n \end{array} \quad \begin{array}{l} n \geq 0 \\ \{n: n \geq 0\} \end{array}$$

③ $0 \leq 2n + 3n$

$$\begin{array}{r} 0 \leq 5n \\ \hline 0 \leq n \end{array} \quad \begin{array}{l} n \geq 0 \\ \{n: n \geq 0\} \end{array}$$

⑤ $7 < (k - 3) + 2$

$$\begin{array}{r} 7 < k + 3 + 2 \\ 7 < k + 5 \\ -5 \quad -5 \\ \hline 2 < k \end{array} \quad \begin{array}{l} k > 2 \\ \{k: k > 2\} \end{array}$$

⑦ $-5(1 - 4a) > -5$

$$\begin{array}{r} -5 + 20a > -5 \\ +5 \quad +5 \\ \hline 20a > 0 \\ \frac{20a}{20} > \frac{0}{20} \\ a > 0 \end{array} \quad \{a: a > 0\}$$

② $-6 > 5n + 5 + 4$ *open circle*

$$\begin{array}{r} -6 > 5n + 9 \\ -9 \quad -9 \\ \hline -15 > 5n \\ \frac{-15}{5} > \frac{5n}{5} \\ -3 > n \end{array} \quad \begin{array}{l} n < -3 \\ \{n: n < -3\} \end{array}$$

④ $2p - 4p \leq -2$

$$\begin{array}{r} -2p \leq -2 \\ \frac{-2p}{-2} \geq \frac{-2}{-2} \\ p \geq 1 \end{array} \quad \{p: p \geq 1\}$$

⑥ $3 - 2(n - 4) > -1$

$$\begin{array}{r} 3 - 2n + 8 > -1 \\ -2n + 11 > -1 \\ -11 \quad -11 \\ \hline -2n > -12 \\ n < 6 \end{array} \quad \{n: n < 6\}$$

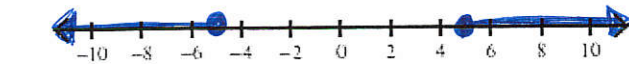
⑧ $-2(b + 1) + 4 < 10$

$$\begin{array}{r} -2b - 2 + 4 < 10 \\ -2b + 2 < 10 \\ -2 \quad -2 \\ \hline -2b < 8 \\ \frac{-2b}{-2} > \frac{8}{-2} \\ b > -4 \end{array} \quad \{b: b > -4\}$$

Section 2-2: Combined inequalities

Solve each inequality algebraically. Write your answer in proper inequality notation. Graph the solution on the number line provided.

1) $x + 6 \geq 11$ or $x + 3 \leq -2$



$$\begin{array}{r} x + 6 \geq 11 \\ -6 \quad -6 \\ \hline x \geq 5 \end{array}$$

$$\begin{array}{r} x + 3 \leq -2 \\ -3 \quad -3 \\ \hline x \leq -5 \end{array}$$

$$\{x: x \leq -5 \text{ OR } x \geq 5\}$$

2) $5 \leq b + 5 < 9$



$$\begin{array}{r} 5 \leq b + 5 < 9 \\ -5 \quad -5 \quad -5 \\ \hline 0 \leq b < 4 \end{array}$$

$$\{b: 0 \leq b < 4\}$$

3) $-6 \leq -2n \leq 2$



$$\begin{array}{r} -6 \leq -2n \leq 2 \\ -2 \quad -2 \quad -2 \\ \hline 3 \geq n \geq -1 \end{array}$$

$$3 \geq n \geq -1$$

$$\{n: -1 \leq n \leq 3\}$$

4) $-3 < r + 3 \leq 5$

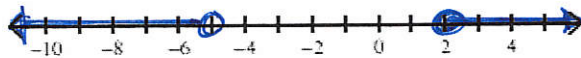


$$\begin{array}{r} -3 < r + 3 \leq 5 \\ -3 \quad -3 \quad -3 \\ \hline -6 < r \leq 2 \end{array}$$

$$-6 < r \leq 2$$

$$\{r: -6 < r \leq 2\}$$

5) $-6 + n \geq -4$ or $\frac{n}{5} < -1$

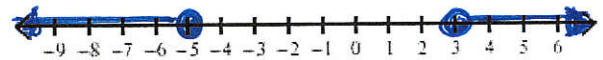


$$\begin{array}{r} -6 + n \geq -4 \\ +6 \quad +6 \\ \hline n \geq 2 \end{array}$$

$$\begin{array}{r} 5 \cdot \frac{n}{5} < -1 \cdot 5 \\ \hline n < -5 \end{array}$$

$$\{n: n < -5 \text{ OR } n \geq 2\}$$

6) $6r \leq -30$ or $4r \geq 12$



$$\begin{array}{r} 6r \leq -30 \\ 6 \quad 6 \\ \hline r \leq -5 \end{array}$$

$$\begin{array}{r} 4r \geq 12 \\ 4 \quad 4 \\ \hline r \geq 3 \end{array}$$

$$\{r: r \leq -5 \text{ OR } r \geq 3\}$$

7) $-10x - 9 \geq 11$ and $-11x - 1 \leq 87$



$$\begin{array}{r} -10x - 9 \geq 11 \\ +9 \quad +9 \\ \hline -10x \geq 20 \end{array}$$

$$\begin{array}{r} -10x \geq 20 \\ -10 \quad -10 \\ \hline x \leq -2 \end{array}$$

$$x \leq -2$$

$$\begin{array}{r} -11x - 1 \leq 87 \\ +1 \quad +1 \\ \hline -11x \leq 88 \end{array}$$

$$\begin{array}{r} -11x \leq 88 \\ -11 \quad -11 \\ \hline x \geq -8 \end{array}$$

$$x \geq -8$$

$$\{x: -8 \leq x \leq -2\}$$

8) $-64 < 6b - 4 < -22$



$$\begin{array}{r} -64 < 6b - 4 < -22 \\ +4 \quad +4 \quad +4 \\ \hline -60 < 6b < -18 \end{array}$$

$$\begin{array}{r} -60 < 6b < -18 \\ 6 \quad 6 \quad 6 \\ \hline -10 < b < -3 \end{array}$$

$$-10 < b < -3$$

$$\{b: -10 < b < -3\}$$

Section 2-4A: Solve each absolute value equation.

① $|6 + 5p| = 14$

$$\begin{array}{r} 6 + 5p = 14 \\ -6 \quad -6 \\ \hline 5p = 8 \end{array}$$

$$p = \frac{8}{5}$$

$$\begin{array}{r} 6 + 5p = -14 \\ -6 \quad -6 \\ \hline 5p = -20 \end{array}$$

$$\frac{5p}{5} = \frac{-20}{5}$$

$$p = -4$$

$$\left\{ -4, \frac{8}{5} \right\}$$

② $|5 - b| = 2$

$$\begin{array}{r} 5 - b = 2 \\ -5 \quad -5 \\ \hline -b = -3 \end{array}$$

$$b = 3$$

$$\begin{array}{r} 5 - b = -2 \\ -5 \quad -5 \\ \hline -b = -7 \end{array}$$

$$b = 7$$

$$\left\{ 3, 7 \right\}$$

③

$|9x - 4| = 86$

$$\begin{array}{r} 9x - 4 = 86 \\ +4 \quad +4 \\ \hline 9x = 90 \end{array}$$

$$9x = 90$$

$$x = 10$$

$$\begin{array}{r} 9x - 4 = -86 \\ +4 \quad +4 \\ \hline 9x = -82 \end{array}$$

$$\frac{9x}{9} = \frac{-82}{9}$$

$$x = \frac{-82}{9}$$

$$\left\{ \frac{-82}{9}, 10 \right\}$$

④

$|3 + 7x| = 73$

$$\begin{array}{r} 3 + 7x = 73 \\ -3 \quad -3 \\ \hline 7x = 70 \end{array}$$

$$7x = 70$$

$$x = 10$$

$$\begin{array}{r} 3 + 7x = -73 \\ -3 \quad -3 \\ \hline 7x = -76 \end{array}$$

$$7x = -76$$

$$x = \frac{-76}{7}$$

$$\left\{ \frac{-76}{7}, 10 \right\}$$

Section 2-4B: Solve each absolute value inequality algebraically. Write your answer in proper algebraic notation. Graph the solution on the number line provided.

⑤ $|x| + 2 \leq 7$



$$|x| \leq 5$$

$$x \leq 5 \quad x \geq -5 \quad \left\{ x: -5 \leq x \leq 5 \right\}$$

⑥ $\frac{-4|m|}{-4} < \frac{-4}{-4}$

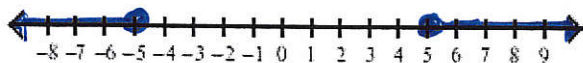


$$|m| > 1$$

$$m > 1 \quad m < -1$$

$$\left\{ m: m < -1 \text{ OR } m > 1 \right\}$$

⑦ $|p| - 5 \geq 0$



$$\begin{array}{r} |p| - 5 \geq 0 \\ +5 \quad +5 \\ \hline |p| \geq 5 \end{array}$$

$$|p| \geq 5$$

$$p \geq 5 \quad p \leq -5$$

$$\left\{ p: p \leq -5 \text{ OR } p \geq 5 \right\}$$

⑧ $|x| + 2 \leq 4$



$$|x| + 2 \leq 4$$

$$\begin{array}{r} |x| + 2 \leq 4 \\ -2 \quad -2 \\ \hline |x| \leq 2 \end{array}$$

$$|x| \leq 2$$

$$x \leq 2 \quad x \geq -2$$

$$\left\{ x: -2 \leq x \leq 2 \right\}$$

$$-1 + |v+1| \leq 2$$



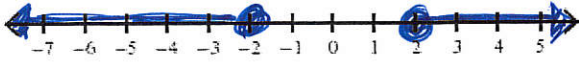
$$|v+1| < 1$$

$$\begin{array}{r} v+1 < 1 \\ -1 \quad -1 \\ \hline v < 0 \end{array}$$

$$\begin{array}{r} v+1 > -1 \\ -1 \quad -1 \\ \hline v > -2 \end{array}$$

$$\{v: -2 < v < 0\}$$

$$\left| \frac{m}{2} \right| + 5 \geq 6$$



$$\begin{array}{r} \left| \frac{m}{2} \right| + 5 \geq 6 \\ -5 \quad -5 \\ \hline \left| \frac{m}{2} \right| \geq 1 \end{array}$$

$$\left| \frac{m}{2} \right| \geq 1$$

$$2 \cdot \left(\frac{m}{2} \right) \geq (1) \cdot 2 \quad 2 \cdot \left(\frac{m}{2} \right) \leq (-1) \cdot 2$$

$$m \geq 2 \quad m \leq -2$$

$$\{m: m \leq -2 \text{ OR } m \geq 2\}$$

$$|-3x| + 6 > -3$$



$$\begin{array}{l} | -3x | > 3 \\ \frac{-3x > 3}{-3 \quad -3} \quad \frac{-3x < -3}{-3 \quad -3} \\ x < -1 \quad x > 1 \end{array}$$

$$\{x: x < -1 \text{ OR } x > 1\}$$

$$3|x+5| \leq 6$$



$$\frac{3|x+5| \leq 6}{3 \quad 3}$$

$$|x+5| \leq 2$$

$$\begin{array}{r} x+5 \leq 2 \\ -5 \quad -5 \\ \hline x \leq -3 \end{array}$$

$$\begin{array}{r} x+5 \geq -2 \\ -5 \quad -5 \\ \hline x \geq -7 \end{array}$$

~~OR~~

$$\{x: -7 \leq x \leq -3\}$$