

Bellwork: Solve the system of equations

$$y + 2x = 11 - 2x$$

$$\begin{aligned} \cancel{y} &= -x^2 - 6x + 8 \\ \underline{y} &= \underline{11 - 2x} \end{aligned}$$

$$\begin{aligned} \cancel{11 - 2x} &= -x^2 - 6x + 8 \\ \cancel{-11 + 2x} & \quad \quad \quad + 2x - 11 \\ -0 &= +x^2 + 4x + 3 \end{aligned}$$

$$0 = x^2 + 4x + 3$$

$$\begin{array}{r} 3 \\ \times 3 \\ \hline 4 \end{array}$$

$$0 = (x+3)(x+1) \quad x = -3, -1$$

$$\boxed{(-3, 17) \quad (-1, 13)}$$

$$y = 11 - 2(-3) \quad y = 11 - 2(-1)$$

Homework 8.2 Solutions

$$10) \quad 4y - 4x = 15 + 4x$$

$$y = x^2 - 4x + 6$$

$$y = x + 3.75$$

$$\cancel{4y} = \cancel{4x} + 15$$

$$\boxed{\begin{aligned} (.5, 4.25) \\ (4.5, 8.25) \end{aligned}}$$

$$11) \quad \underline{x = 6}$$

$$x^2 + y^2 = 61$$

$$6^2 + y^2 = 61$$

$$\begin{array}{r} \cancel{36} + y^2 = 61 \\ -\cancel{36} \quad \quad -\cancel{36} \end{array}$$

$$\sqrt{y^2} = \sqrt{25}$$

$$y = 5, -5$$

$$\boxed{(6, 5) \quad (6, -5)}$$

Today's Objectives:

I can solve simple and compound inequalities

SIMPLE

☞ Contains one inequality symbol.

☞ ex. $2x + 6 \leq 5$

COMPOUND (AND)

☞ Contains two inequality symbols written as one "three-sided" inequality.

☞ ex. $-4 < 2x + 6 \leq 5$

COMPOUND (OR)

☞ Composed of two simple inequalities joined with 'or'.

☞ ex. $2x + 6 \leq 5$ or $x - 4 > 5$

$$-2 \leq x < 3$$

~~$$-2 < x < 3$$~~

$$x \leq -2 \quad x > 3$$

~~$$x \leq -2 \quad x > 3$$~~

GENERAL RULES

- Solve inequalities the same way you would solve equations, treating the inequality symbol like an equal sign.
- When solving the "three-sided" inequalities, isolate x in the middle, and perform any operations to all 3 sides.
- If you multiply or divide both sides of an inequality by a negative, you must reverse the inequality symbol(s).

$$\begin{aligned} \textcircled{1.} \quad & 3x + 7 \leq -2 \\ & \quad \quad \quad \swarrow \quad \searrow \\ & \quad \quad \quad \cancel{3}x \leq \frac{-9}{\cancel{3}} \\ & \quad \quad \quad \boxed{x \leq -3} \end{aligned}$$

$$(-\infty, -3]$$

$$\begin{aligned} \textcircled{2.} \quad & 5 - 4x \leq 25 \\ & \quad \quad \quad \swarrow \quad \searrow \\ & \quad \quad \quad \cancel{5} - 4x \leq \frac{20}{\cancel{-4}} \\ & \quad \quad \quad \boxed{x \geq -5} \end{aligned}$$

$$[-5, \infty)$$

$$\begin{aligned} \textcircled{3.} \quad & -3 \leq 2x + 1 < 7 \\ & \quad \quad \quad \swarrow \quad \searrow \\ & \quad \quad \quad \frac{-4}{\cancel{2}} \leq \frac{\cancel{2}x}{\cancel{2}} < \frac{6}{\cancel{2}} \\ & \quad \quad \quad \boxed{-2 \leq x < 3} \end{aligned}$$

$$[-2, 3)$$

$$\begin{aligned} \textcircled{4.} \quad & -7 < 5 - 3x \leq 5 \\ & \quad \quad \quad \swarrow \quad \searrow \\ & \quad \quad \quad \frac{-12}{\cancel{-3}} < \frac{\cancel{-3}x}{\cancel{-3}} \leq \frac{0}{\cancel{-3}} \\ & \quad \quad \quad \boxed{4 > x \geq 0} \\ & \quad \quad \quad \boxed{0 \leq x < 4} \end{aligned}$$

$$\textcircled{5.} \quad 3x < -9 \text{ or } x - 8 > -1$$
$$x < -3 \quad x > 7$$

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$$\textcircled{6.} \quad 6 - x \leq 2 \text{ or } 2x \leq x + 2$$
$$-6 \quad -6 \quad -x \quad -x$$

$$-x \leq -4$$
$$\frac{-1}{-1} \quad \frac{-1}{-1} \quad x \leq 2$$
$$x \geq 4 \text{ or}$$

$$(-\infty, 2] \cup [4, \infty)$$