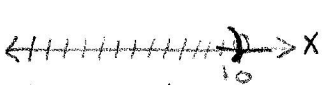


Useful Guidelines: To solve for a linear inequality:
 Step 1: Simplify each side by using the distributive property to clear parentheses as needed.
 Step 2: Gather all terms with variables on one side of the inequality and all numbers on the other side.
 Step 3: Solve for that variable until the coefficient of the variable is one.
Note: Remember to reverse the direction of the inequality symbol when you need to multiply or divide each side of an inequality by a negative number.
 * Intersection of A and B: $A \cap B = \{x | x \text{ is an element of } A \text{ and } x \text{ is an element of } B\}$ overlapping
 * Union of A and B: $A \cup B = \{x | x \text{ is an element of } A \text{ or } x \text{ is an element of } B\}$

Solve the following linear inequalities and graph the solution sets:

1. a) $2x + 30 < 50$ sol set: $\{x | x < 10\}$

$$\frac{2x + 30}{-30 \quad -30} < \frac{50}{-30 \quad -30}$$

$$\frac{2x}{2} < \frac{20}{2}$$


$$x < 10 \quad (-\infty, 10)$$

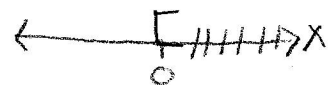
2. a) $9 - x \geq -4(x - 2) + 1$ sol set $\{x | x \geq 0\}$

$$9 - x \geq -4x + 8 + 1$$

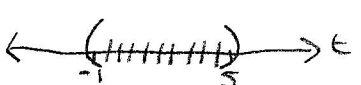
$$9 - x \geq -4x + 9$$

$$\frac{9 + 3x \geq 9}{-9 \quad -9}$$

$$\frac{3x}{3} \geq \frac{0}{3}$$

$$x \geq 0$$


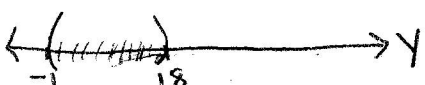
3. a) $3 < t + 4 < 9$ $(-1, 5)$

$$\frac{-4 \quad -4 \quad -4}{-1 < t < 5}$$
 sol set $\{t | -1 < t < 5\}$


4. For each of the following double inequalities, decide whether intersection or union should be used. Draw a number line graph of each solution. Then give the solution in both solution set and interval notation.

a) $y - 3 < 15$ and $y + 2 > 1$ Intersection

$$\frac{+3 \quad +3}{y < 18} \cap \frac{-2 \quad -2}{y > -1}$$


$$y < 18 \cap y > -1$$


$$(-1, 18)$$

sol set: $\{y | y < 18 \text{ and } y > -1\}$

b) $15 + 3y \geq y + 5$ sol set $\{y | y \geq -5\}$

$$\frac{-5 \quad -5}{10 + 3y \geq y}{-3y \quad -3y}$$

$$\frac{10}{-2} \geq \frac{-2y}{-2}$$


$$[-5, \infty)$$

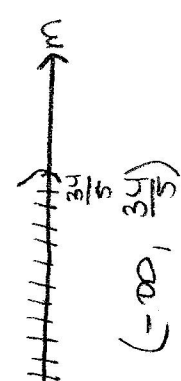
 b) $\frac{3}{4}(m + 4) > \frac{1}{2}(3 - m) + \frac{1}{2}$

$$\frac{3m + 12}{-3m} > \frac{-24 + 8m + 2}{-3m}$$

$$12 > -24 + 5m + 2$$

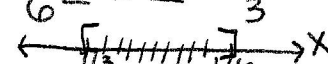
$$12 > -22 + 5m$$

$$\frac{+22 \quad +22}{34 > 5m}$$


$$m < \frac{34}{5}$$


b) $-3 \leq -6x - 2 \leq 12$ sol set $\{m | m \leq \frac{34}{5}\}$

$$\frac{+2 \quad +2 \quad +2}{-1 \leq -6x \leq 14}$$

$$\frac{-6 \quad -6 \quad -6}{-\frac{1}{6} \geq x \geq -\frac{7}{3}}$$


b) $\frac{-2x \leq -4}{-2 \quad -2} \cup \frac{-10x \geq 0}{-10 \quad -10}$ Union

$$x \geq 2 \cup x \leq 0$$


$$(-\infty, 0] \cup [2, \infty)$$

sol set: $\{x | x \geq 2 \text{ or } x \leq 0\}$