

COLLEGE ALGEBRA

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 Class Time: 11:30-1:45 Date: 1-24-08

GPS #9

1.8 SOLUTIONS OF LINEAR INEQUALITIES

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: $A \cap B = \{x | x \text{ is an element of } A \text{ and } x \text{ is an element of } B\}$

* Union of A and B: $A \cup B = \{x | x \text{ is an element of } A \text{ or } x \text{ is an element of } B\}$

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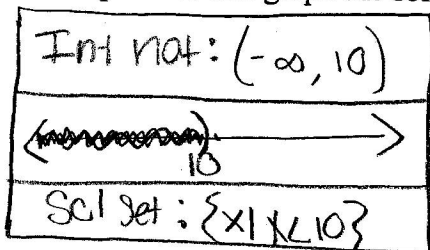
Solve the following linear inequalities and graph the solution sets:

1. a) $2x + 30 < 50$

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

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

$$x < 10$$



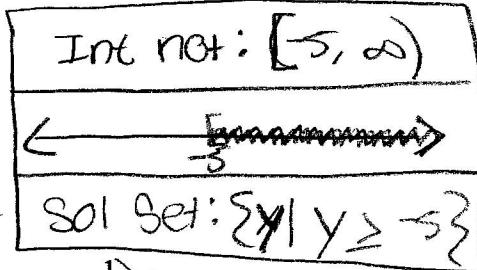
b) $15 + 3y \geq y + 5$

$$\frac{15 + 3y}{-2} \geq \frac{y + 5}{-2}$$

$$-15 - 3y \geq -y - 5$$

$$-2y \geq -10$$

$$y \geq 5$$



2. a) $9 - x \geq -4(x - 2) + 1$

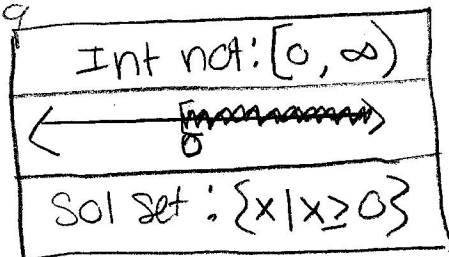
$$9 - x \geq -4x + 8 + 1$$

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

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

$$3x \geq 0$$

$$x \geq 0$$



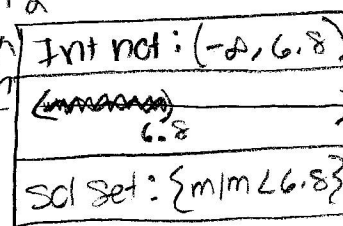
b) $\frac{3}{4}(m + 4) > (-2(3 - m) + \frac{1}{2})4$

$$3(m + 4) > -8(3 - m) + 2$$

$$3m + 12 > -24 + 8m + 2$$

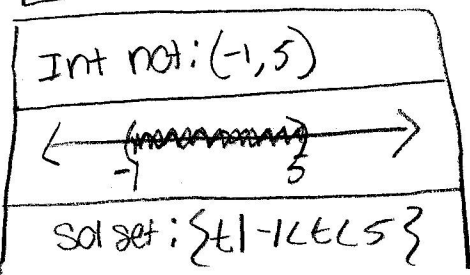
$$-5m > -34$$

$$m < 6.8$$



3. a) $3 < t + 4 < 9$

$$-4 < t < 5$$

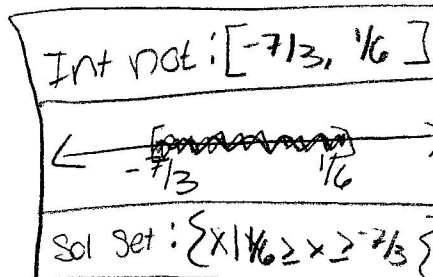


b) $-3 \leq -6x - 7 \leq 12$

$$\frac{-3 + 7}{-6} \leq x \leq \frac{12 + 7}{-6}$$

$$\frac{4}{-6} \leq x \leq \frac{19}{-6}$$

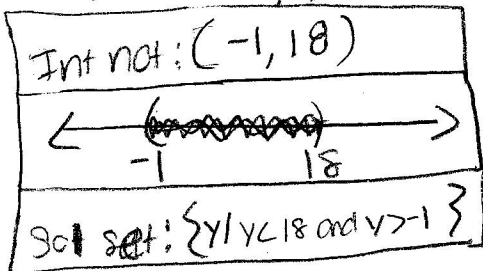
$$\frac{1}{6} \geq x \geq -\frac{7}{3}$$



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 $y + 2 > 1$

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



b) $2x \leq -4$ or $-10x \geq 0$

$$x \leq -2 \cup x \leq 0$$

