INTERMEDIATE ALGEBRA

GPS # 12 **3.3 LINEAR INEQUALITIES** **NAME:** Kelly Fenton

29/26

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.

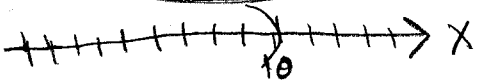
Solve the following linear inequalities and graph the solution sets:

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

$-30 \quad -30$

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

$x<10$



Solution Set: $\{x \mid x<10\}$

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

$-y \quad -y$

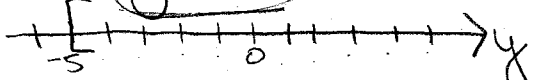
$15+2y \geq 5$

$-15 \quad -15$

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

$y \geq -5$

Solution set: $\{y \mid y \geq -5\}$ (such that)

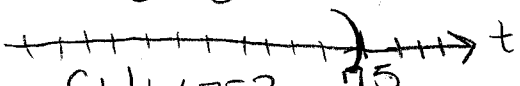


2. a) $3t<150+t$

$-t \quad -t$

$\frac{2t}{2}<\frac{150}{2}$

$t<75$

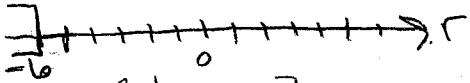


$\{t \mid t<75\}$

b) $\frac{12}{-2} \leq \frac{-2r}{-2}$

$-6 \geq r$

$r \leq -6$



$\{r \mid r \leq -6\}$

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

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

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

$+x \quad +x$

$9 \geq -3x+9$

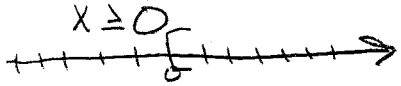
$-9 \quad -9$

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

$0 \leq x$

$x \geq 0$

$\{x \mid x \geq 0\}$ Sol. Set



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

$4\left(\frac{3}{4}m+3\right)>\left(-6+2m+\frac{1}{2}\right)4$

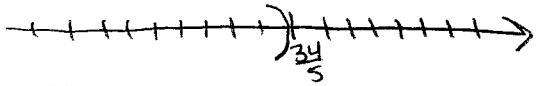
$3m+12>-24+8m+2$

$12>-24+5m+2$

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

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

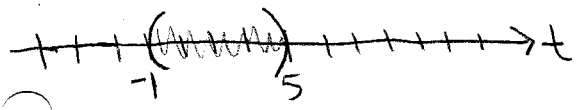
$\{m \mid m<\frac{34}{5}\}$ Sol. Set



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

$-4 \quad -4 \quad -4$

$-1<t<5$



Sol. Set $\{t \mid -1<t<5\}$

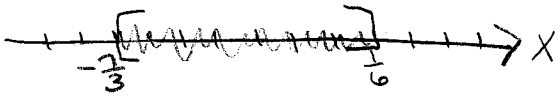
b) $-3 \leq -6x-2 \leq 12$

$+2 \quad +2 \quad +2$

$-1 \leq -6x \leq 14$

$\frac{-1}{-6} \quad \frac{-6x}{-6} \quad \frac{14}{-6}$

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



Sol. Set $\{x \mid \frac{1}{6} \geq x \geq -\frac{7}{3}\}$