

# Solving Inequalities

EX:  $2x + 3 < 5$

$$2x + 3 - 3 < 5 - 3$$

$$2x < 2$$

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

$$x < 1$$

Equation

$$2x + 3 = 5$$

$$2x = 2$$

~~Number line~~  
-∞                      1  
(-∞, 1)

EX:  $-2x + 3 < 5$

$$-2x + 3 - 3 < 5 - 3$$

$$-2x < 2$$

$$\frac{(-2)x}{(-2)} > \frac{2}{(-2)}$$

$$x > -1$$

$$(-1, +\infty)$$

~~Number line~~  
-1                      +∞

EX:  $6x + 5 \geq 4x - 2$

$$6x + 5 - 5 \geq 4x - 2 - 5$$

$$6x \geq 4x - 7$$

$$6x - 4x \geq 4x - 7 - 4x$$

$$2x \geq -7 \Rightarrow x \geq -7/2$$

$$[-7/2, +\infty)$$

~~Number line~~  
-7/2

$$\text{EX: } -4 < 5x-3 \leq 1$$

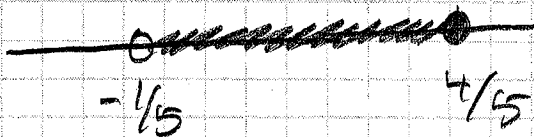
$$-4+3 < 5x-3+3 \leq 1+3$$

$$-1 < 5x \leq 4$$

$$-\frac{1}{5} < \frac{5x}{5} \leq \frac{4}{5}$$

$$-\frac{1}{5} < x \leq \frac{4}{5}$$

$$\left(-\frac{1}{5}, \frac{4}{5}\right] = \left\{ x \mid -\frac{1}{5} < x \leq \frac{4}{5} \right\}$$



$$\text{EX: } \frac{1}{3x-2} > 0$$

$$3x-2 > 0$$

$$3x-2+2 > 0+2$$

$$3x > 2$$

$$x > \frac{2}{3}$$

$$\frac{1}{a} > 0 \Rightarrow$$

$$\Rightarrow a > 0$$

$$\frac{1}{a} < 0 \Rightarrow$$

$$a < 0$$

$$\text{EX: } \frac{1}{3x-2} > 1 \quad ???$$