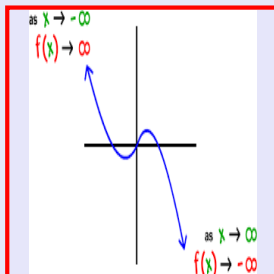


**Math 245**  
**Spring 2022**  
**Lecture 6**



Solve  $3(x-2) + 8 > 5x - 12$

$$3x - 6 + 8 > 5x - 12$$

$$3x + 2 > 5x - 12$$

$$3x - 5x > -12 - 2$$

$$-2x > -14$$

Divide by  $-2$

$$\frac{-2}{-2}x < \frac{-14}{-2}$$

$$x < 7$$



Interval notation  $(-\infty, 7)$

Set-Builder notation  $\{x \mid x < 7\}$

Such that

Solve  $2(x+4) - 12 \leq 4(x-2) + 12$

$$2x + 8 - 12 \leq 4x - 8 + 12$$

$$2x - 4 \leq 4x + 4$$

$$2x - 4x \leq 4 + 4$$

$$-2x \leq 8$$

Divide by -2

$$\frac{-2}{-2}x \geq \frac{8}{-2}$$

$$x \geq -4$$



I.N.  $\Rightarrow [-4, \infty)$

S.B.N.  $\Rightarrow \{x \mid x \geq -4\}$

Solve  $-4 < 5x + 6 \leq 21$

$$-4 - 6 < 5x + 6 - 6 \leq 21 - 6$$

$$-10 < 5x \leq 15$$

$$\frac{-10}{5} < \frac{5}{5}x \leq \frac{15}{5}$$

$$-2 < x \leq 3$$

Hint: Isolate

$x$  in the middle

Graph



I.N.  $\Rightarrow (-2, 3]$

S.B.N.  $\Rightarrow \{x \mid -2 < x \leq 3\}$

Absolute Value equation

$$|ax+b|=k$$

IF  $k < 0 \Rightarrow$  No Solution

IF  $k \geq 0 \Rightarrow$  Solve  $ax+b=k$  OR  $ax+b=-k$

$x = \dots$

$x = \dots$

Final Answer must be in Solution Set.

Solve  $|3x-5| = -1 \Rightarrow$  No Solution  $\boxed{\emptyset}$

Solve  $|2x+5|=1$

$$2x+5=1 \quad \text{OR} \quad 2x+5=-1$$

$$2x=1-5 \quad 2x=-1-5$$

$$2x=-4 \quad 2x=-6$$

$$\boxed{x=-2}$$

$$\boxed{x=-3}$$

$\{-3, -2\}$

Solve  $|3x-2| - 5 = 2$

$$|3x-2| = 2+5$$

$$|3x-2| = 7$$

$$3x-2=7$$

$$\text{OR} \quad 3x-2=-7$$

$$3x=7+2$$

$$3x=-7+2$$

$$3x=9$$

$$3x=-5$$

$$\boxed{x=3}$$

$$\boxed{x=-\frac{5}{3}}$$

$\{-\frac{5}{3}, 3\}$

Hint: Isolate  
the abs. Value  
first.

Solve  $2|x+3|+5=13$

Hint: Isolate  
the abs. value.

$$2|x+3|=13-5$$

$$2|x+3|=8$$

$$|x+3|=\frac{8}{2}$$

$$|x+3|=4$$

$$x+3=4 \quad \text{OR} \quad x+3=-4$$

$$\vdots$$

$$\boxed{x=1}$$

$$\vdots$$

$$\boxed{x=-7}$$

Solution  
Set  
 $\{-7, 1\}$

Solving  $|ax+b|=|cx+d|$

$$ax+b=cx+d \quad \text{OR} \quad ax+b=-(cx+d)$$

Solve  $|2x-5|=|x-13|$

$$2x-5=x-13 \quad \text{OR} \quad 2x-5=-(x-13)$$

$$2x-x=-13+5$$

$$\boxed{x=-8}$$

$$2x-5=-x+13$$

$$2x+x=13+5$$

$$3x=18$$

$$\boxed{x=6}$$

$\{-8, 6\}$

Solve  $|2x + 4| = |2x - 4|$

$$2x + 4 = 2x - 4$$

$$2x - 2x = -4 - 4$$

$$0 = -8$$

False

OR

$$2x + 4 = -(2x - 4)$$

$$2x + 4 = -2x + 4$$

$$2x + 2x = 4 - 4$$

$$4x = 0$$

$$x = \frac{0}{4}$$

$$\boxed{x = 0}$$

$$\{0\}$$

Some math review:

Simplify  $\frac{12}{21} = \frac{\cancel{3} \cdot 4}{\cancel{3} \cdot 7} = \frac{4}{7}$

Simplify  $\frac{3x + 12}{3x - 36} = \frac{\cancel{3}(x + 4)}{\cancel{3}(x - 12)} = \boxed{\frac{x + 4}{x - 12}}$

Simplify  $\frac{x^2 + 3x - 4}{x^2 - 16} = \frac{\cancel{(x + 4)}(x - 1)}{\cancel{(x + 4)}(x - 4)}$

$$= \boxed{\frac{x - 1}{x - 4}}$$