# Solving Equations & Inequalities

**Class Goals** – ***By the end of the period, you will understand and be able to…***

- Solve Equations.
- Solve Inequalities.
- Solve Absolute Value Equations & Inequalities.

## Pre-Requisite Exercises

### One-Step Equations

1. $x+6=10$

$-6\ \ -6$

$x=4$ ✓

2. $x-1=-5$

$+1\ \ +1$

$x=-4$ ✓

3. $2x=11$

$\frac{2x}{2}=\frac{11}{2}$

$x=5.5$

4. $3\times\frac{x}{3}=6\times3$

$x=18$ ✓

### Two-Step Equations

Multiplied by the reciprocal

5. $5x-3=-18$

$+3\ \ +3$

$\frac{5x}{5}=\frac{-15}{5}$

$x=-3$

6. $\frac{x}{3}-2=6$

$+2\ \ +2$

$8\times\frac{x}{3}=8\times3$

$x=24$ ✓

7. $\frac{-4}{3}x=8$

$\frac{3}{-4}\cdot\frac{-4}{3}x=8\cdot\frac{3}{-4}$

$x=\frac{24}{-4}$

$x=-6$

### Multi-Step Equations

8. $3(x+5)=15$

$3x+15=15$

$-15\ \ -15$

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

$x=0$

9. $\frac{2}{3}x-1=x+7$

$3\left(\frac{2}{3}x-1\right)=3(x+7)$

$2x-3=3x+21$

$-2x\ \ -2x$

$-3=x+21$

$-21\ \ -21$

$-24=x$

10. $\frac{1}{2}x+\frac{2}{3}=\frac{10}{7}$

### Evaluating Absolute Value Expressions

11. $|12+7|$

12. $|5-9|$

13. $3|5-1|$

14. $5-|2-7|$

15. $\frac{1}{2}|10-16|+24$

16. $\frac{|12-18|}{3}+7|2-5|$

# Solving Equations

a. $2x+6=3x-5$ b. $3(5-x)=6-3x$ c. $\frac{1}{2}x+\frac{2}{3}=\frac{8}{5}$

**Practice Problems – Solve the equations and check your solutions.**

1. $4-x=2$ 2. $4x=2x-12$ 3. $\frac{x}{4}+6=-8$

4. $x+4=2x-5$ 5. $-(x+1)=2(3x-1)$ 6. $\frac{3}{2}(x-5)=7$

# Solving Absolute Value Equations

$|2x+5|=21$

Step 1:

Step 2:

Step 3:

**Practice Problems – Solve the absolute value equations and check your solutions.**

7. $|4x-2|=6$

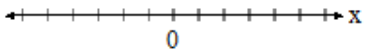
8. $|5-x|=6$

9. $|-2x+1|-3=11$

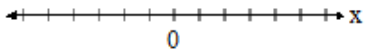
10. $|2x+7|=13$

## Graphing Inequalities

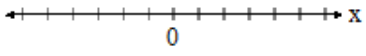
a. $x > 2$



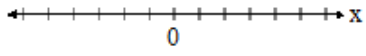

b. $x \leq -1$




c. $x \geq -4$




d. $x < 3$



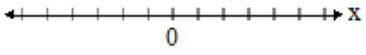

*Open Circle vs. Closed Circle*

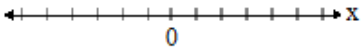
## Solving & Graphing Inequalities

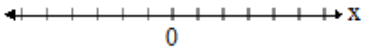
a. $3x + 6 \geq 9$

b. $-2x - 3 > -5$

c. $3 < 4x - 5 < 27$



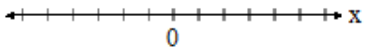



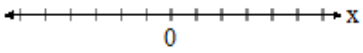

***What must you remember when solving inequalities?***

**Practice Problems – Solve the inequality and graph on a number line.**

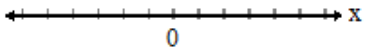
11. $2(x-3) > -4$



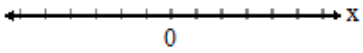

12. $3-2x \geq 7$



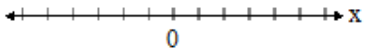

13. $2x+4 < x+3$



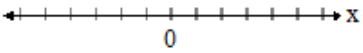

14. $2(x+3) < 8$




15. $3 < \frac{1}{2}x - 1 < 5$




16. $3-x \geq 2$



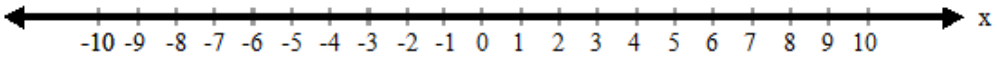
# Solving Absolute Value Inequalities

$|2x+1|>5$

Step 1:

Step 2:

Step 3:




**Practice Problems – Solve the absolute value inequality and graph your solution.**

17. $\left|\frac{x}{2}+3\right|<2$

18. $|2-4x|\geq 10$