

Lesson 2.8- SWBAT solve absolute value equations.
 Kick off: Take out your homework and answer the following questions.

1) Solve and graph the inequality. State the answer in interval notation.
 $-2(x+3) + 6 > 10$
 $-2x - 2 + 6 > 10$
 $-2x + 4 > 10$
 $-2x > 6$
 $-4 > -2$
 $-4 > -2$
 $x < 3$

Graph: $(-\infty, 3)$

2) Solve and graph the inequality. State the answer in set builder notation.
 $-6(1+2x) \geq 6(2x-1) + 2x$
 $-6 - 12x \geq 12x - 6 + 2x$
 $-6 - 12x \geq 14x - 6 + 2x$
 $-6 - 12x \geq 16x - 6$
 $-12x \geq 16x$
 $-28x \geq 0$
 $x \leq 0$

Graph: $\{x | x \leq 0\}$

The absolute value of a real number is the distance from zero and that number on the number line.
 We know that an absolute value is ALWAYS positive. Therefore: $|a| = a$ and $|-a| = a$.

To solve an absolute value equation, you need to create 2 equations:
 a Positive Equation and a Negative Equation.

Example: Solve $|x| = 7$

Positive: $x = 7$

Negative: $-x = 7$
 $x = -7$

Notes: $|2| = 2$, $|-4| = 4$.
 "drop the bars" (referring to the absolute value bars).
 "bars are -" (referring to the negative sign in the negative case).

Practice:

1) $|x| - 9 = 0$
 $x - 9 = 0$
 $+9 +9$
 $x = 9$
 $-x - 9 = 0$
 $+9 +9$
 $-x = 9$
 $-1 -1$
 $x = -9$

2) $\frac{|x|}{5} + 4 = -2$
 $\frac{x}{5} + 4 = -2$
 $+4 -4 -4$
 $\frac{x}{5} = -6$
 $\frac{x}{5} = -6(5)$
 $x = -30$
 $\frac{-x}{5} + 4 = -2$
 $+4 -4 -4$
 $\frac{-x}{5} = -6$
 $\frac{-x}{5} = -6(5)$
 $-x = -30$
 $-1 -1$
 $x = 30$

3) $3|x| + 1 = -11$
 $3x + 1 = -11$
 $-1 -1$
 $3x = -12$
 $\frac{3x}{3} = \frac{-12}{3}$
 $x = -4$
 $-3x + 1 = -11$
 $-1 -1$
 $-3x = -12$
 $\frac{-3x}{-3} = \frac{-12}{-3}$
 $x = 4$

4) $|m + 3| = 2$
 $m + 3 = 2$
 $-3 -3$
 $m = -1$
 $-(m + 3) = 2$
 $-m - 3 = 2$
 $+3 +3$
 $-m = 5$
 $-1 -1$
 $m = -5$

5) $|3x + 2| - 5 = 4x$

6) $|3p - 2| = 28$

7) $|3n - 2| = 26$

8) $|4 - 3r| = 19$

9) $|6m - 2| = 0$

10) $|7x - 2| = 44$

11) $5|x - 2| = 30$

12) $\frac{|-m-8|}{2} = 2$

13) $\left|\frac{x}{3}\right| = 3$

14) $|5a + 1| = a + 9$

15) $|2x + 4| = x$

16) $5 - 8| -2n| = -75$