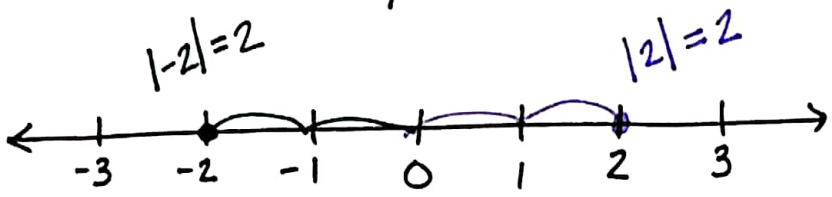
January 23

Absolute Value Equations

Absolute value tells you distance from 0.



Ex1 Solve: $2|x+6|=8$

Step 1: Get absolute value alone first.

$$\frac{2|x+6|}{2}=\frac{8}{2}$$

$$|x+6|=4$$

Step 2: If absolute value equals a negative number, STOP! The answer is no solution. If absolute value equals a positive number or zero, keep going.

Step 3: Take equation out of absolute value. You have two equations, one equal to a positive number and one equal to a negative number.

$x+6=4$ $\qquad$ $x+6=-4$

Step 4: Solve for variable.

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

$x+6=-4$
$-6 \quad -6$
$x=-10$

Ex2 Solve: $-5|3x+2|+25=10$

$-25 \quad -25$

$\frac{-5|3x+2|}{-5} = \frac{-15}{-5}$

$|3x+2| = 3$

$3x+2=3$ $\quad -2 \quad -2$

$\frac{3x}{3} = \frac{1}{3}$

$x = .33$

~or~

$x = \frac{1}{3}$

$3x+2=-3$ $\quad -2 \quad -2$

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

$x = -1.67$

~or~

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

Ex3 Solve: $|x-7|+10=4$

$-10 \quad -10$

$|x-7| = -6$ ← negative ☹

no solution

Ex4 Solve: $|2x-8|-4=-4$

$+4 \quad +4$

$|2x-8| = 0$

$2x-8=0$

$+8 \quad +8$

$\frac{2x}{2} = \frac{8}{2}$

$x = 4$

$2x-8=-0$

* Don't need this because there is no such thing as -0.

Graph Absolute Value Functions

Ex5 Graph: $y = |x+2| - 4$

To get to absolute value:

ALPHA WINDOW 1: abs(