

Unit 1 Day 3: Solving Absolute Value Functions

Taking the absolute value of something means: keeping it positive (take away any negatives) - distance from zero

STEPS:

- 1) Isolate the absolute value (if needed)
- 2) Drop the absolute value symbol and set up two equations

One equation equals a positive and the other equals a negative

- 3) Solve both equations

- 4) Write your answers as $x = \underline{\quad}$ and $x = \underline{\quad}$

Ex 1) Solve $|x + 2| = 7$

$$\begin{array}{r} x+2=7 \\ -2 \quad -2 \\ \hline x=5 \end{array} \quad \begin{array}{r} x+2=-7 \\ -2 \quad -2 \\ \hline x=-9 \end{array}$$

$x=5$ and $x=-9$

Ex 2) Solve $|x+8| - 5 = 2$

$$\begin{array}{r} |x+8| - 5 = 2 \\ +5 \quad +5 \\ \hline |x+8| = 7 \end{array}$$

$$\begin{array}{r} x+8=7 \\ -8 \quad -8 \\ \hline x=-1 \end{array} \quad \begin{array}{r} x+8=-7 \\ -8 \quad -8 \\ \hline x=-15 \end{array}$$

$x=-1$ and $x=-15$

Ex 3) Solve $3|-8x| + 8 = 80$

$$\begin{array}{r} 3|-8x| + 8 = 80 \\ -8 \quad -8 \\ \hline 3|-8x| = 72 \\ \hline |-8x| = 24 \end{array}$$

$$\begin{array}{r} -8x = 24 \\ -8 \quad -8 \\ \hline x = -3 \end{array} \quad \begin{array}{r} -8x = -24 \\ -8 \quad -8 \\ \hline x = 3 \end{array}$$

$x = -3$ and $x = 3$

Ex 4) Solve $\frac{|7x+4|}{8} = 3$

$$|7x+4| = 24$$

$$\begin{array}{r} 7x+4=24 \\ -4 \quad -4 \\ \hline 7x=20 \\ \hline x=2.86 \end{array} \quad \begin{array}{r} 7x+4=-24 \\ -4 \quad -4 \\ \hline 7x=-28 \\ \hline x=-4 \end{array}$$

$x=2.86$ and $x=-4$

YOU TRY: Solve the following absolute value problems

1. $|-2x + 6| = 6$

2. $-5|3 + 4x| = -115$

$x=0$ and $x=6$

$x=5$ and $x=6.5$

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

3. $-5|5x - 5| + 2 = -73$

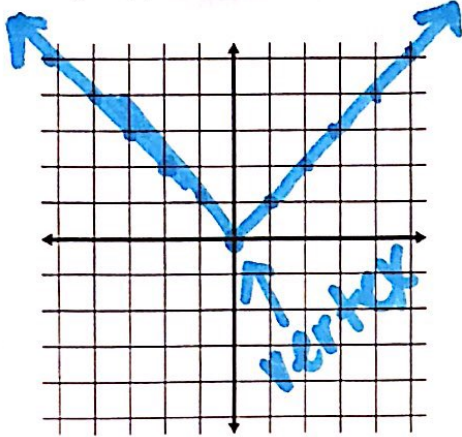
$$\begin{array}{r} -5|5x-5| + 2 = -73 \\ -2 \quad -2 \\ \hline -5|5x-5| = -75 \\ \hline |5x-5| = 15 \end{array}$$

symmetrical!

GUIDED NOTES: Graphs of Absolute Value Functions

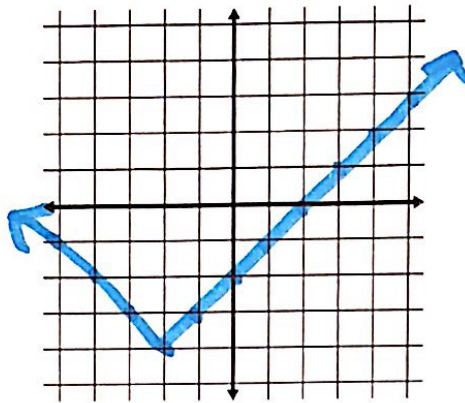
"V"
Stretches it

EX1. $y = |x|$



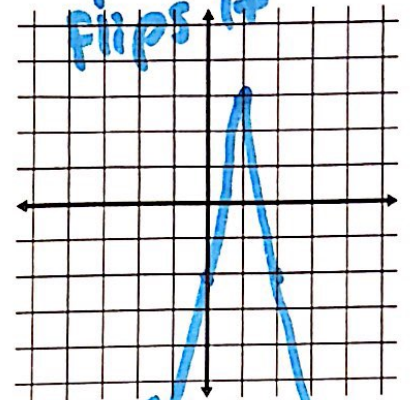
x	y
-2	2
-1	1
0	0
1	1
2	2

EX2. $y = |x+2| - 4$



x	y
-4	-2
-3	-3
-2	-4
-1	-3
0	-2

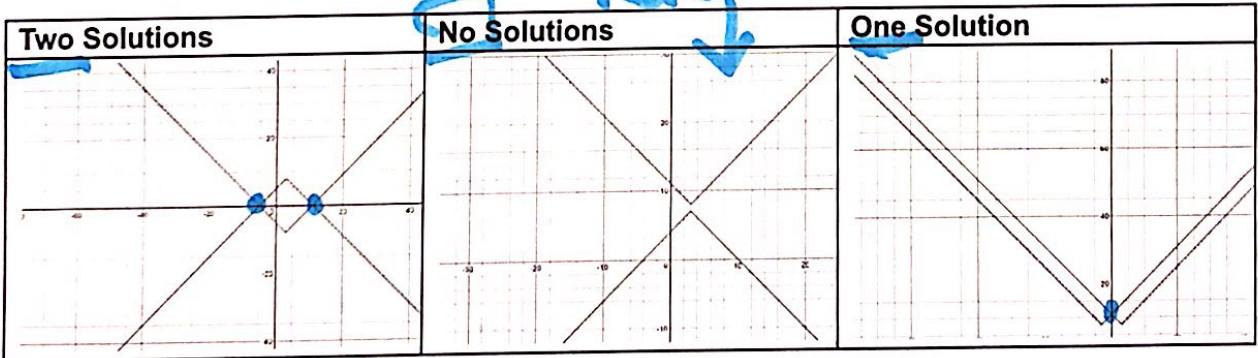
EX3. $y = -5|x-1| + 3$



x	y
-1	-7
0	-2
1	3
2	-2
3	-7

Systems of Absolute Value Equations

never touch!



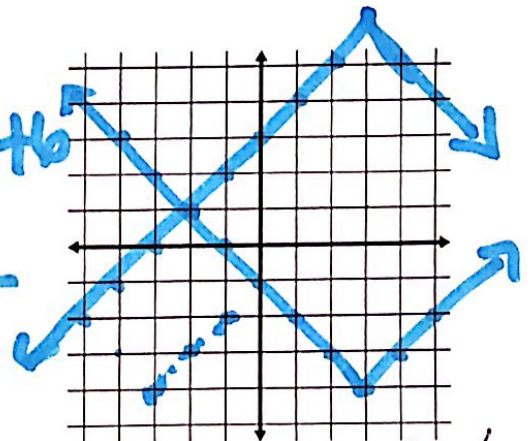
EX4. $y = |x-3| - 4$
 $y = -|x-3| + 6$

$y = |x-3| - 4$

x	y
1	-2
2	-3
3	-4
4	-3
5	-2

$y = -|x-3| + 6$

x	y
1	5
2	4
3	3
4	4
5	5



Solution (8, 1) (-2, 1)