C11 - 7.2 - $y = |x + c|$ Piecewise Linear Absolute Value Notes

Graphing Absolute Values

$y = |x + 2|$

"+" case: "−" case: Distribute a positive into the absolute value

| If already negative combine |

$y_1 = +(x + 2)$ $y_2 = -(x + 2)$ Distribute a negative into the absolute value
$y_1 = x + 2$ $y_2 = -x - 2$

$y = |x + 2|$

Table of Values $y_2 = -x - 2$ $y_1 = x + 2$

x	y		x	y		Pt.
-5	-3		-5	3		(-5,2)
-3	-1		-3	1		(-3,1)
-2	0		-2	0		(-2,0)
-1	1		-1	1		(-1,1)
0	2		0	2		(0,2)

$y = x + 2$ $y = |x + 2|$
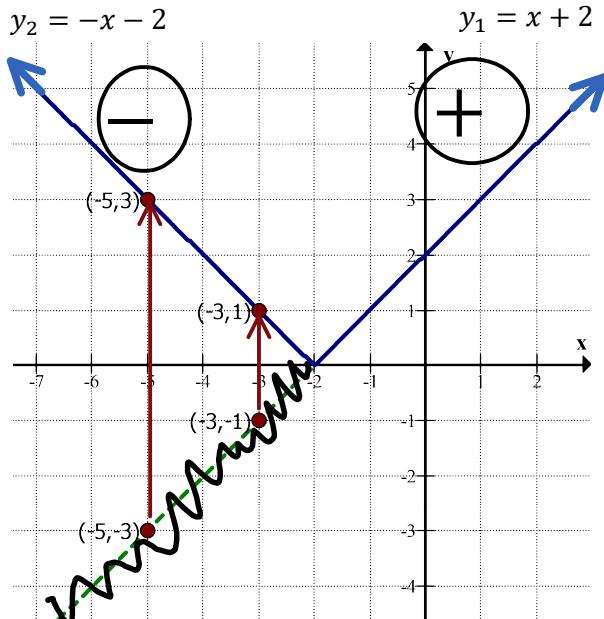
Set inside absolute value = 0 and solve
TOV
Vertex: $(-2,0)$

Notice the graph of $y = |x + 2|$ is the graph of $y = x + 2$ and $y = -x - 2$ without any negative y values. Transfer any negative y value to a positive y value.

Piecewise function: $y = \begin{cases} x + 2, & \text{if } x \geq -2 \\ -x - 2, & \text{if } x < -2 \end{cases}$ $y = \begin{cases} \text{"+" case,} & \text{Domain of "+" case} \\ \text{"−" case,} & \text{Domain of "−" case} \end{cases}$

Notice: The domain of the negative case is not equal to.

Domain of positive case: **Domain of negative case:**

$x + 2 \geq 0$ Set what is inside the $x + 2 < 0$ Set what is inside
$-2 \quad -2$ absolute value greater $-2 \quad -2$ the absolute value
$x \geq -2$ than or equal to zero. $x < -2$ less than zero.