Name: _____ Period: _____ Date: _____

# Graphing Absolute Value Functions Guided Notes

## Absolute Value Function

An absolute value function is of the form:

$$f(x) = |x|$$

Such that when:

$$x > 0 \Rightarrow f(x) = x$$

$$x < 0 \Rightarrow f(x) = -x$$

The graph of an absolute value function is shown.

## Translations of Absolute Value Function

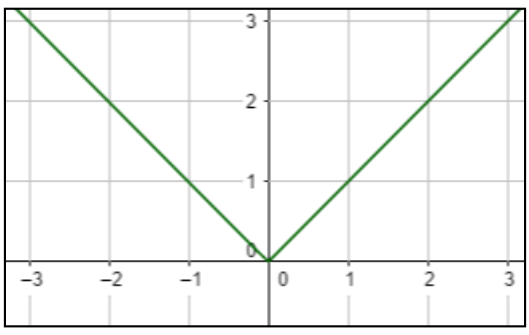
An absolute value function translated in y-direction is of the form:

$$f(x) = |x| + k$$

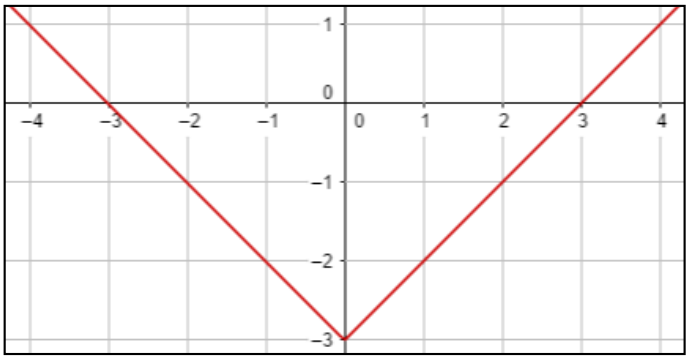
- If $k$ is positive, the graph of $y = |x|$ is translated up by $k$ units.
- If $k$ is negative, the graph of $y = |x|$ is translated down by $k$ units.

### Problem 1: What is the graph of $y = |x| - 3$?

Since $k$ is negative i.e. $k = -3$, so the graph of $y = |x|$ is translated 3 units down.




$f(x) = |x|$




$f(x) = |x| - 3$

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# Graphing Absolute Value Functions Guided Notes

## Translations of Absolute Value Function

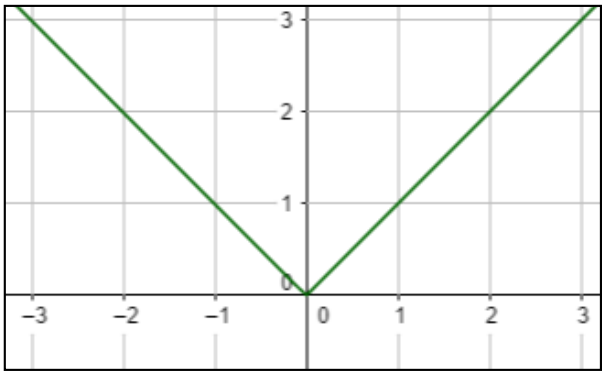
An absolute value function translated in x-direction is of the form:

$$f(x) = |x + h|$$

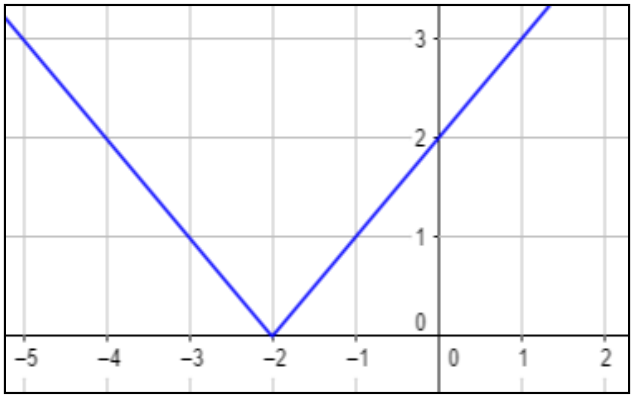
- If $h$ is positive, the graph of $y = |x|$ is translated left by $h$ units.
- If $h$ is negative, the graph of $y = |x|$ is translated down by $h$ units.

### Problem 2: What is the graph of $y = |x + 2|$?

Since $h$ is positive i.e. $h = 2$, so the graph of $y = |x|$ is translated 2 units left.




$f(x) = |x|$



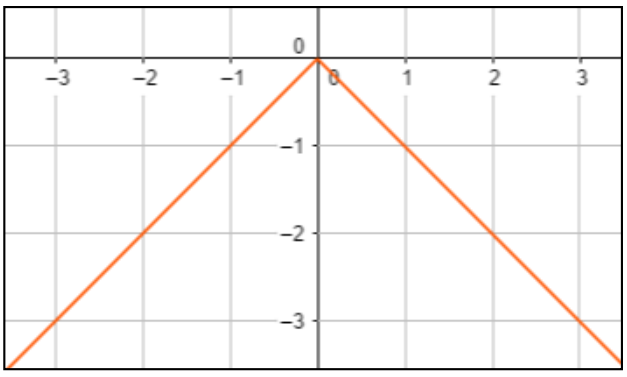

$f(x) = |x + 2|$

## Reflection of Absolute Value Function

An absolute value function reflected downwards is of the form:

$$f(x) = -|x|$$

The graph of the reflected absolute value function is shown.




$f(x) = -|x|$