

Your Name

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9/16 2020

Notes

Lesson 1.2

ABSOLUTE VALUE AND FUNCTION TRANSLATIONS

Math Skill Objective: To be able to identify the parent function given a function. To be able to describe transformations of functions. To be able to graph translated absolute value functions using a Slope and Vertex transformations.

[HSF.BF.B.3](#)

Life Lessons: Consider where the real value of things and people come from.

Learning patterns and shortcuts can take you pretty far, but sometimes you need to really understand what is going on in order to keep track of the changes that are happening.

There are two ways to get a person to reach a shelf: You can grab them and lift them up to reach. Or you can plant the seed in their mind that they are too short so that they come up with the idea that they need to jump and make themselves "taller" in order to reach the shelf.

1.2 Absolute Value and Function Transformation Levelled (2) (1).notebook September 18, 2020

Absolute Value $|x|$

The value a number has is decided by its distance from 0

Sooo... Always a positive value

ex. whether or not I drive forward or backwards, I am still driving 500 ft.

ex. $|-5| = 5$

$|5| = 5$

Ask: How far is this from 0?

Tip: take the positive value

ex. $|-22| = ?$ $|156| = ?$ $|-33+22| = ?$

Handwritten notes: 22 , 156 , $|-11|$, 11 , $1-33+22$, $33+22$, 55 , $1-33 \cdot 2$, $|-66|$, 66 , $|-33| \cdot |2|$, $33 \cdot 2$, 66 .
 Add/subtract cont's separate
 Multiply you can take Abs. Value separately

Sep 5-10:33 AM

Horizontal Translation

$y = f(x-h)$ Note: because formula has a (-) in it, the shift is opposite of what is expected on the x-axis

$y = a|x-h|+k$

ex. $y = |x-2|+0$
 $a=1$ $h=2$ $k=0$
 Slope is: $1/2$ Vertex is: $(2,0)$

ex. $y = |x+3|+0$
 $a=1$ $h=-3$ $k=0$
 Slope is: $1/3$ Vertex is: $(-3,0)$

EX. Write the new Absolute Value function that transforms $y = 5|x-2|+3$ after a horizontal shift right 5 units.

$y = a|x-h|+k$ $a=5$ $h=2+5$ $k=3$
 Slope is: $5/4$ Vertex is: $(7,3)$
 Function: $y = 5|x-7|+3$

why?

The function rule $f(x)$ has been not yet been applied to the input x value, so to translate the function horizontally we must move the x input value indirectly. The h value amount is subtracted in order to have the vertex begin at h when it normally would begin at 0.

ex. If $y = |x-2|$, when the new vertex is $(2,0)$, so when $x = 2$ then $y = |(2)-2| = |0|$

$| -3 | = 3$

$| 3 | = 3$

$y = \underline{\quad} (x - \underline{-3})^2 + \underline{\quad}$

right 2 $\rightarrow h = 2$ $y = (x - 2)^2$

left 3 $\rightarrow h = -3$ $y = (x + 3)^2$

Vertical Translation

↑ y-values move up or down
↓

$y = f(x) + k$ Note: because formula has a (+) in it, the shift corresponds as expected on the y-axis

$y = a|x-h| + k$

ex. $y = |x| - 2$
 $a = 1$ $h = 0$ $k = -2$
 Slope is: $|\pm 1|$ Vertex is: $(0, -2)$

ex. $y = |x| + 3$
 $a = 1$ $h = 0$ $k = 3$
 Slope is: $|\pm 1|$ Vertex is: $(0, 3)$

ex. Write an Absolute Value function that transforms $y = 5|x - 2| + 3$ after a Vertical shift down 5 units.
 $a = 5$ $h = 2$ $k = 3 - 5 = -2$
 Slope is: $5|\pm 5|$ Vertex is: $(2, -2)$
 Function: $y = 5|x - 2| - 2$

why? The function rule $f(x)$ has been applied to the input x value, so when k is added, the k is added to the y value to move it up or down directly.