The Absolute Value Function Name:

This document is interactive. You will need the following items:

- Graph Paper
- Straight Edge – Ruler
- A TI NSpire with the .tns document Absolute Value with Sliders

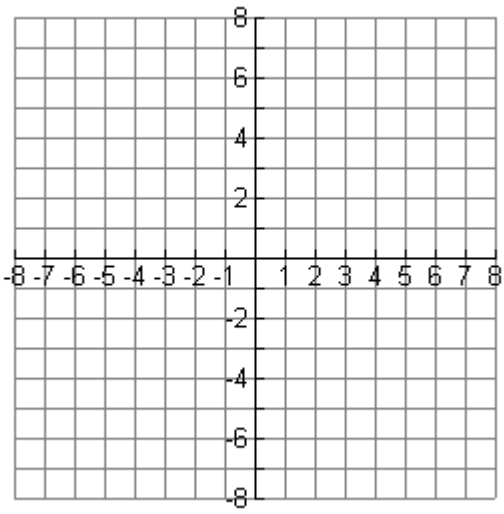
You will need to do the following:

- Carefully read and follow directions.
- Stay on task as this needs to be completed in one period.
- Draw graphs.
- Work with a partner by sharing the NSpire.
- Write answer to questions.

Complete the table and draw a graph of the following function on the coordinate plane provided.

$f(x) = |x|$

x	-7	-4	0	2	3	6	8
$\|x\|$							



This is the **reference graph**.

At the end of this lesson you should know the following:

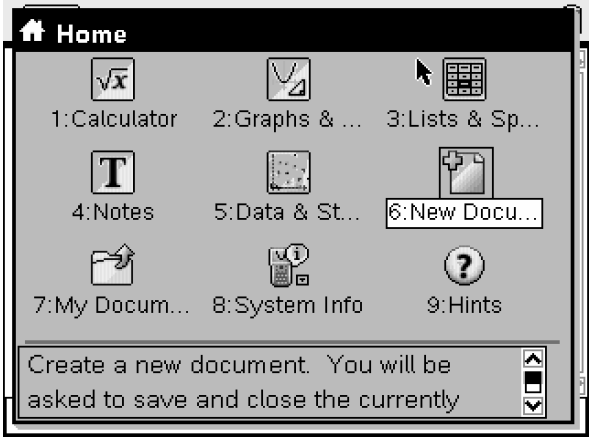
- How the values *a*, *h*, and *k* translate the reference graph. In other words, how do these three values change the reference graph you've drawn above?
- How to graph the Absolute Value Function quickly and correctly without a table of values.

Open the Absolute Value with Sliders file.

(home) (7) My Documents

Find the folder that contains the document.

Your teacher will help you with this step.

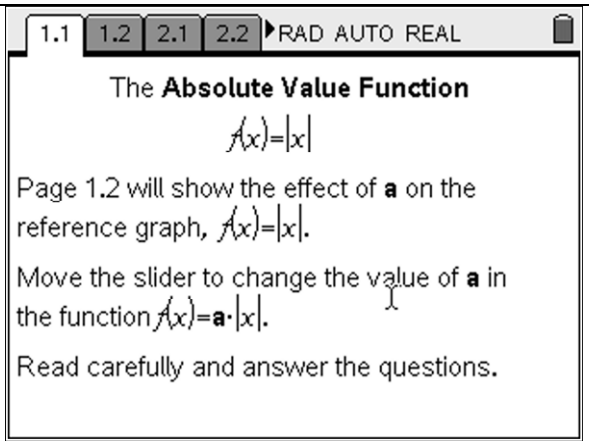


Here is a snapshot of the first page of the document.

You are on Page 1.1.

Your task is to discover the effect of the coefficient "a" on the graph of the function $f(x) = a|x|$

To move to the next, push (ctrl) and the Right Arrow.



Go to Page 1.2. See the snapshot at the right.

What is the vertex?

Is this the same as the reference graph?

What is the slope of the "right" side of the graph?

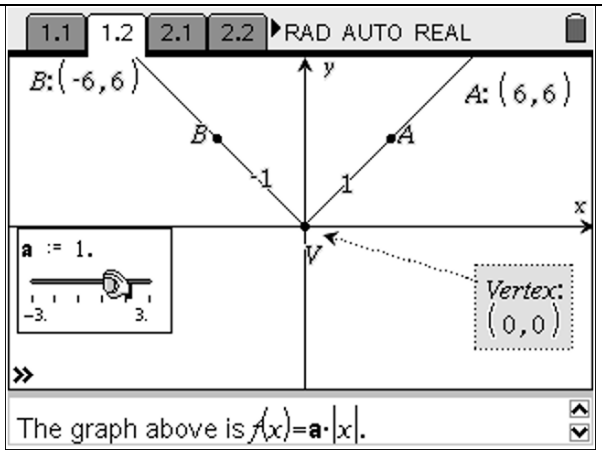
What is the slope of the "left" side of the graph?

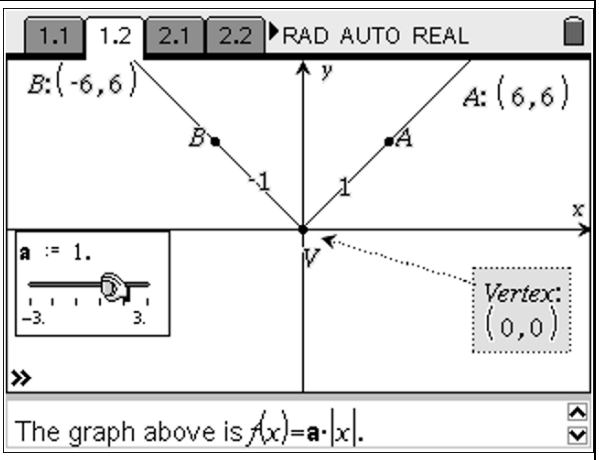
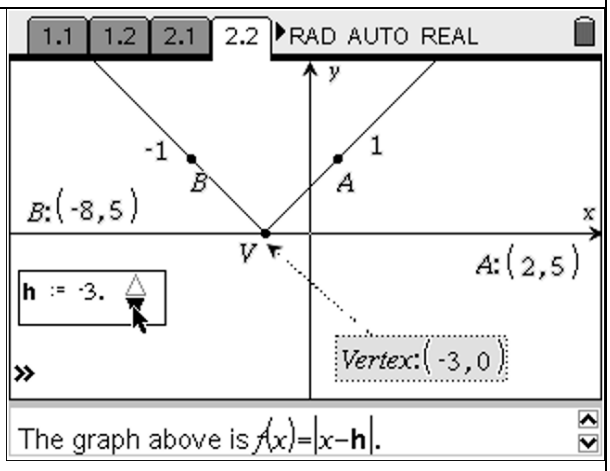
Grab the slider with the (ctrl) . . See right. Increase the value of **a**. Let go of the slider push (esc).

Does this change the vertex?

When $a > 0$, which direction is the opening?

What is the effect of **a** on the slopes on both sides of the graph of $f(x) = a|x|$?



Grab the slider with the ctrl . ✍ . Make the value of **a** negative. Does this change the vertex? When $a<0$, which direction is the opening? What is the effect the values of the slopes on both sides of the graph of $f(x)=\mathrm{a}\lvert x\rvert$?	
Summarize the two effects of changing **a** on the reference graph. 1. 2.	
Go to Page 2.1. Read it. Go to Page 2.2. See snapshot at right. Click the slider to change the value of $h=-3$ What is the vertex? Substitute $h=-3$ and write the function of this graph.	

Change **h** to a positive value.

Write your value of **h**. $h =$ _____

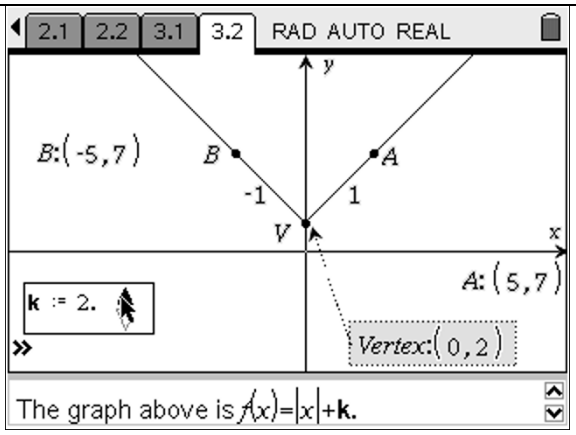
Substitute your value and write the function.

When $h > 0$, which direction does the vertex move.

When $h < 0$ which direction does the vertex move?

What function will make the vertex be at the point $(4, 0)$?

Does changing the value of **h**, change the slopes of the two sides of the graph?

Go to Page 3.1. Read it. Go to Page 3.2. See snapshot at right. Click the slider to change the value $k = 2$? Vertex? Write the function for this value of **k**.	

Change **k** to a negative value.

Write your value of **k**. $k =$ _____

Substitute your value and write the function.

When $k > 0$, which direction does the vertex move.

When $k < 0$ which direction does the vertex move?

What function will make the vertex be at the point $(0, -3)$?

Does changing the value of **k**, change the slopes of the two sides of the graph?

Summarize the effects of **a**, **h**, and **k** on the graph of $f(x) = a|x - h| + k$.

Complete the Steps for Graphing the Absolute Value Function.

1. Find the coordinates of the _____. They will be $(\_\_\_\_, \_\_\_\_)$
2. Determine the direction of _____.
3. Find the _____ of the two sides of the graph.
4. Use the slopes to find more _____.

Graph the following:

$g(x) = |x+5| + 3$

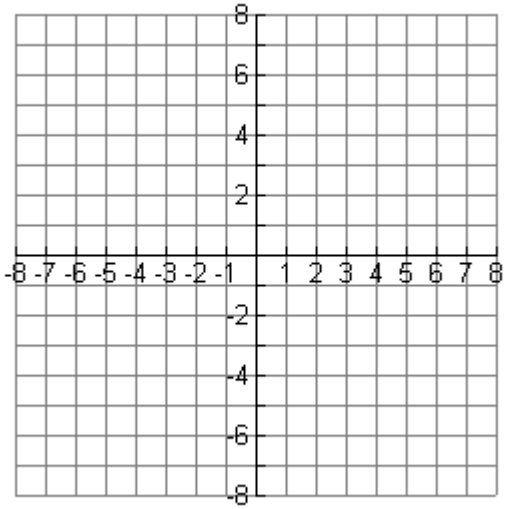
Identify $a = \_\_\_\_$, $h = \_\_\_\_$, $k = \_\_\_\_$

Vertex:

Direction of Opening:

Slope of the Right Side:

Slope of the Left Side:



$f(x) = -|x+2| - 1$

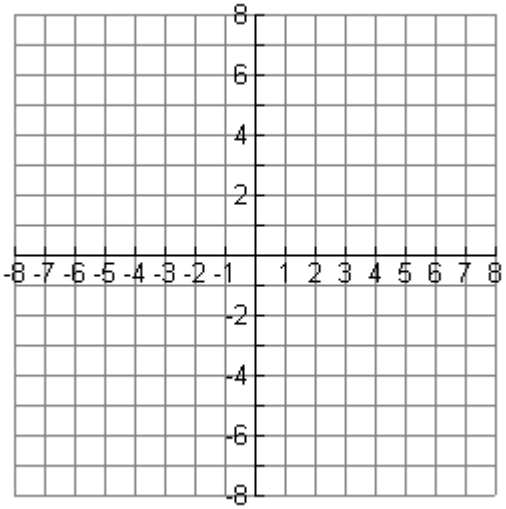
Identify $a = \_\_\_\_$, $h = \_\_\_\_$, $k = \_\_\_\_$

Vertex:

Direction of Opening:

Slope of the Right Side:

Slope of the Left Side:



Go on to pages 4.1 through 4.7 to answer the questions about these two graphs.