What's My Absolute Value?

Name ______________________

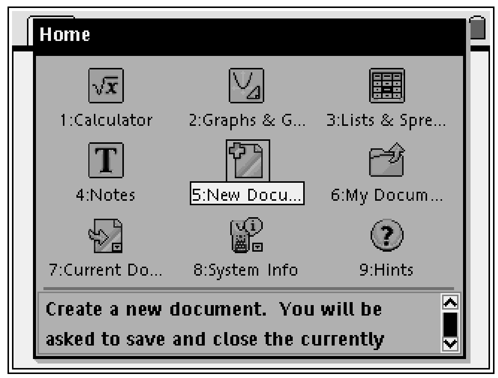
Class ______________________

In this activity, you will:

- *discover the rule for taking the absolute value of a variable inside a function.*
- *discover the rule for taking the absolute value of a function.*

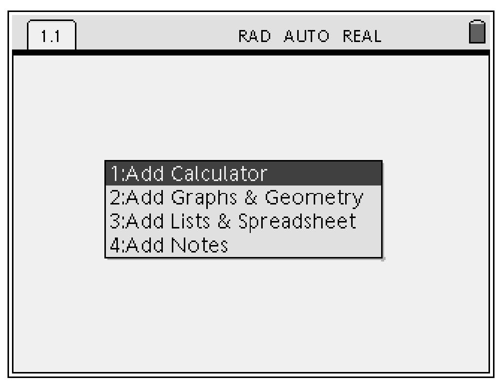
Open a new document (see directions below) on your handheld and work by yourself or with a partner to complete the activity. Use this document as a reference and to record your answers.

Press (home). This takes you to the home screen.

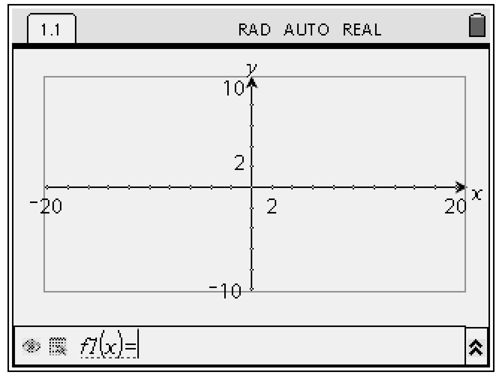


Arrow to ❺ New Document.

Press (enter)



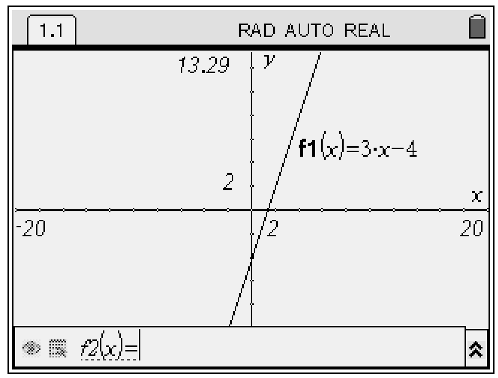
Type ⟨2⟩ Add Graphs and Geometry.



Graph y = 3x - 4.

Just type 3x – 4 for the f1(x) on your calculator screen. Press ⟨enter⟩ to see the graph.

Sketch the graph on your paper.



What kind of graph did you get?

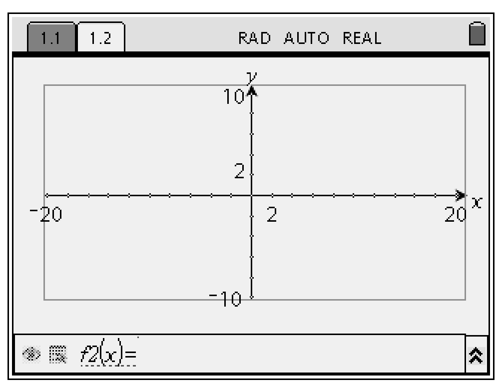
Graph is linear. Y-intercept is (0, -4)
X-intercept is (4/3, 0).

Are you surprised?

No, this is to be expected.

We are going to add another graph page to our document.

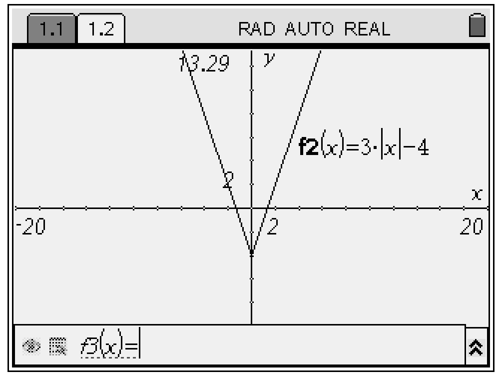
⟨ctrl⟩ I; ⟨2⟩ Add Graphs and Geometry.



Graph y = 3abs(x)-4.

Type just as it is written in f2(x) on your calculator. Press enter to see the graph.

Sketch the graph on your paper.



What kind of graph did you get?

Absolute value graph with y-intercept of (0, -4), x-intercepts (- 4/3, 0) and (4/3, 0).

Are you surprised?

No, we should expect an absolute value graph.

How would you describe how you would graph this transformation?

All negative x-values are changed to positive x-values before they are put into the function, so the positive x-values stay and the positive x-value points reflect over the y-axis. The negative x-values are gone.

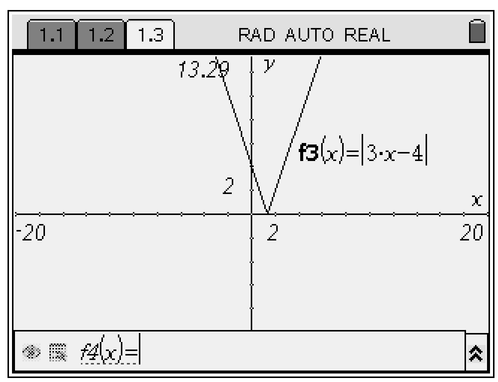
Don't know? Just wait, it'll come to you!

We are going to add another graph page to our document.

Graph y = abs(3x – 4).

Type just as it is written in f3(x) on your calculator. Press enter to see the graph.

Sketch the graph on your paper.



What kind of graph did you get?

We get another absolute value graph, but this time, there are no negative y-values.

Are you surprised?

No.

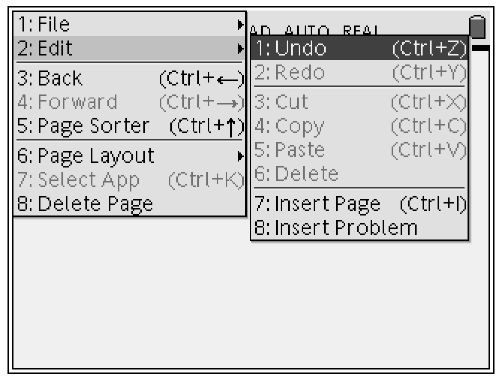
How would you describe how you would graph this transformation?

All positive y-values stay the same. All negative y-values reflect across the x-axis.

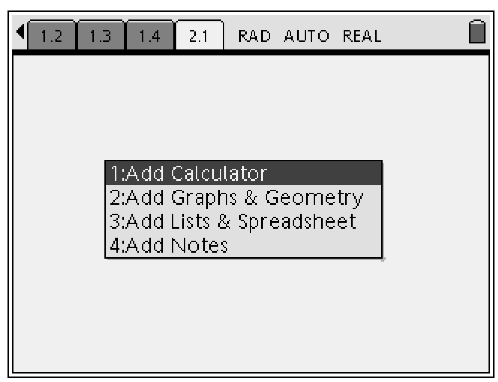
Don’t know? Just wait, it’ll come to you!

This time we are going to add another problem to our document.

Press ctrl home; ❷ Edit, ❽ Insert Problem.



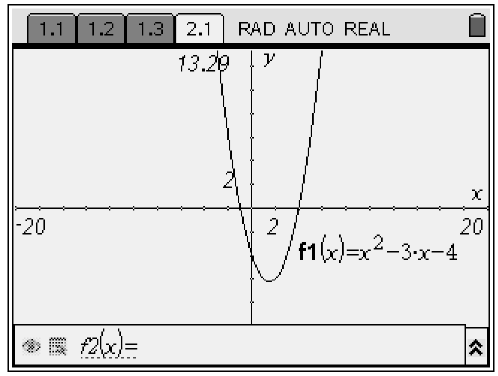
2 Add Graphs and Geometry.



Graph $y = x^2 - 3x - 4$.

Just type $x^2 - 3x - 4$ for the f1(x) on your calculator screen. Press enter to see the graph.

Sketch the graph on your paper.



What kind of graph did you get?

You get a parabola.

Are you surprised? Why or why not?

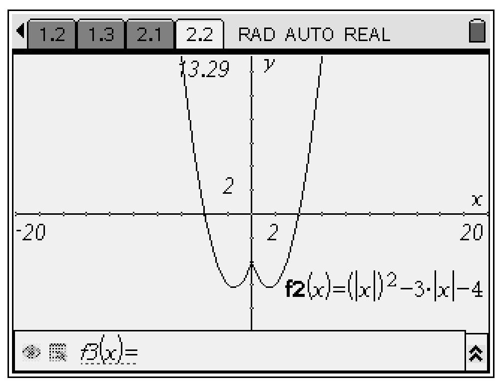
No, this graph is expected for a quadratic.

We are going to add another graph page to our document.

. Graph $y = (\text{abs}(x))^2 - 3\text{abs}(x) - 4$.

Type just as it is written into f2(x) on your calculator. Press enter to see the graph.

Sketch the graph on your paper.



Describe the graph did you got?

A "parabola" with 2 humps at bottom.

Are you surprised?

Shouldn't be if they understood the first part, but most will say yes.

How would you describe how you would graph this transformation?

Once again you ignore the negative x-values and reflect the positive x-value points over the y-axis.

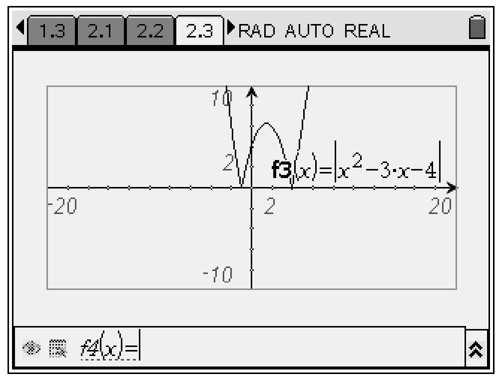
If you don't see it, go back and look at problem 1.2. What do these 2 problems have in common? (Remember to go back to a previous page press ctrl ◄).

We are going to add another graph page to our document.

Graph y = abs(x^2 – 3x – 4).

Type just as it is written into f3(x) on your calculator. Press · to see the graph.

Sketch the graph on your paper.



What kind of graph did you get?

A parabola with the bottom part (that part below the x-axis) reflected across the x-axis.

Are you surprised?

No. We work the function and then change all values to positive.

How would you describe how you would graph this transformation?

Take all negative y-values and make them positive.

If you don't see it, go back and look at problem 1.3. What do these 2 problems have in common?

Now if I give you a graph (no equation) can you graph the absolute value of the variable and the absolute value of the function?

Explain how you would go about graphing each of these. How are the graphs the same? **Both graphs have the same original points. We are using the absolute value on both graphs.** How are they different? **We are taking the absolute value of the "x" on the first graph and the absolute value of the "y" on the second graph.**

Try graphing $f(|x|)$ and $|f(x)|$ given the following f(x).