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EMS 572

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Using TI-84 Graphing Calculators to Introduce Absolute Value Functions in an Algebra I Course:

Every student should have a TI-83 or 84 graphing calculator.

Give students the following list of numbers, and have them copy them down in a vertical column with ‘x’ as the column heading:

x

-5

-4

-3

-2

-1

0

1

2

3

4

5

Instruct students to find the absolute value of each number listed and write it down next to the number in a new column they should label ‘y’.

Tell the students “You should all have a list of 11 x and y values that you can now treat as x and y coordinates and plot them in your calculator.”

Have students write down, in their own words, a description of the graph and what its function might look like. Push them towards thinking about how they generated the y values.

Give students about 3 minutes to get their ideas down, and bring the class back together to discuss.

Ask, “What does the graph look like?”, “What function would pass through these points?”, and have them “Sketch what you believe the lines of the graph will look like.”

If no one suggests y=abs(x) or f(x)=abs(x), or if someone does, have students graph the absolute value function in their calculator so they can see that it passes through the points they plotted.

Ask students, “Now what happens when we put a number in front of the absolute value?”

Have students inspect the graphs of:

y=2abs(x)

y=5abs(x)

y=-2abs(x)

y=-5abs(x)

Have students describe how changing the coefficient in front of the abs(x) changes the graph and predict what y=(1/2)abs(x) would look like.

After students have spent about 8 minutes on the part above, ask them what would happen if we added a number to the x inside the absolute value.

Have them graph:

y=abs(x+2)

y=abs(x-2)

y=abs(x-5)

Have students describe how changing the number added to x, inside the absolute value, changes the graph and predict what y=abs(x+5) would look like.

After students have spent about 8 minutes on the part above, ask them what would happen if we added a number to the end of the function after the absolute value piece.

Have them graph:

y=abs(x)+2

y=abs(x)-2

Have students describe how changing the number added to the end of the function changes the graph and predict what y=abs(x)+4 would look like.

Bring the class together one last time to discuss the general form. Write on the board:

y=a**abs**(x-b)+c

Explain that, “This is the general form of an absolute value function.”

Ask the class, as a whole, to predict what y=-3abs(x-4)+2 would look like. Where would the point of the ‘v shape’ lie? (Give a coordinate) In what direction would the ‘v shape’ open? Would the graph be vertically compressed or stretched?