# Introduction to Piecewise Functions

by – Eric Prowse

## Activity overview

*This activity introduces the concept of piecewise functions through an analysis of functions and their respective domains.*

## Concepts

*Analyzing and graphing piecewise functions.*

## Teacher preparation

*Students need to be able to graph a linear function, create an equation of a line, be introduced to domain, and know how to use the basic functions of the TI-nspire.*

## Classroom management tips

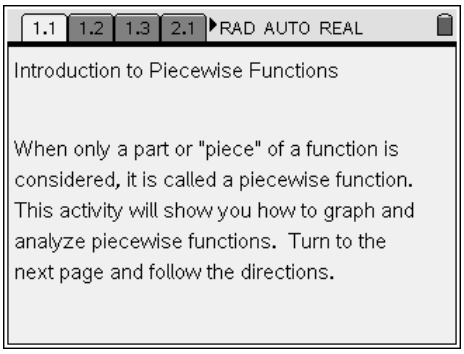
*This activity can be done independently, as a demonstration, or together as a class. It depends on how comfortable students are working with the TI-nspire.*

## TI-Nspire Applications

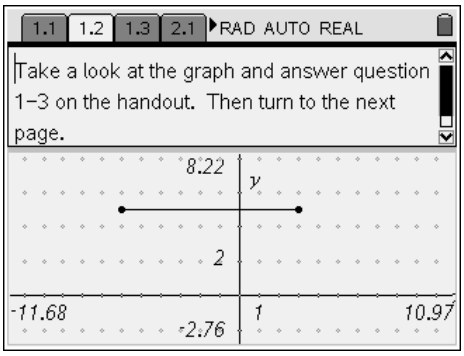
*Introduction to Piecewise Functions.tns*

## Step-by-step directions

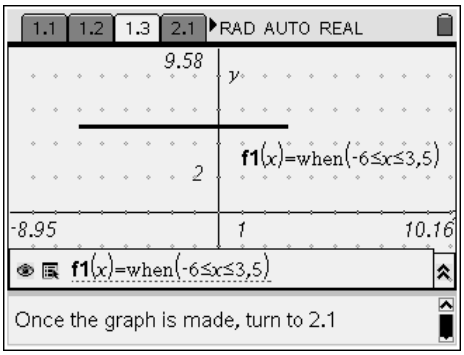
Start off by having students open up the file "Introduction to Piecewise Functions.tns". From there decide if students will work on this independently or as a class.



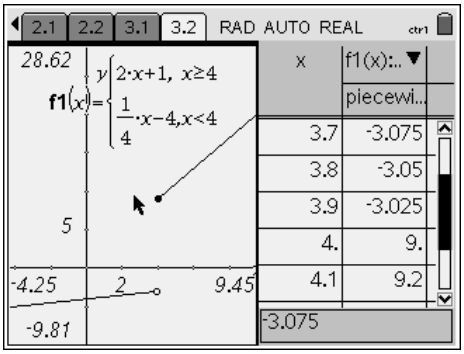

This page opens up the discussion about a function having a given domain. Students need to see that the graph of y=5 only exists for $-6 \le x \le 3$.



In number 3 of the handout, students will use their understanding of domain to enter the equation of the graph as shown at the right.




The heart of the discussion occurs when they work on problems 5-10. Here, it is important that they develop a method for graphing piecewise functions by hand. The function table at the right offers a discussion of domain, and how the graph "jumps" at x=4. This also can give students a starting point at how they can start graphing a piecewise function. After that, they can either use slope of each part of the function to create a second point or plug in another value for each part of the function (i.e. f(0) and f(5) ).




## Assessment and evaluation

- *If students are able to complete the final problem of the handout, then they should be able to work on further tasks using piecewise functions.*

## Activity extensions

- *From here students could practice graphing piecewise functions or work on applications of piecewise functions.*

Student TI-Nspire Document
*Introduction to Piecewise Functions.tns*

Name : _____

Open up the file *Introduction to Piecewise Functions.tns* on the TI-*n*spire. Read the first page and follow the instructions.

1.) If the segment shown were a full line, what would be the equation of the line?

f(x) = _____

2.) For what values of x does the graph exist? Write the possibilities of x in an inequality statement. This is called the domain of the function.

3.) Try to recreate the graph from page one by filling in the statement below and entering it in the entry line on page 1.3 of the TI-*n*spire.

f1(x)=when(domain, value of f(x))

4.) In the graph on page 2.2 there are multiple values of the function. However, when we enter the function we do so in one formula. Below is the format used for piecewise functions. Part of it has been filled out. Fill out the rest.

$$f1(x) = \begin{cases} -2, -6 \le x < -3 \\ \\ \\ \end{cases}$$

Turn to page 3.1 and follow the directions.

5.) For what value of x does the graph make a "jump"?

6.) Why does one point have an open circle and the other closed?

7.) How can the location of those points be found?

8.) Once those points are located, how could another point be found to complete each part of the piecewise function?

9.) Looking at the table, what is the value of $f1(0)$? How about $f1(5)$?

10.) How could you calculate those values without using the table?

Finally, demonstrate that you are able to graph piecewise functions without the use of a graphing calculator. Graph the following:

$$f(x)=\begin{cases}3x, x \geq -2\\ -2x-6, x<-2\end{cases}$$