Notes Piecewise Defined Functions

A piecewise defined function is a function that is defined by 2 or more equations over a specified domain.

To find a ***function value*** with a piecewise defined function you must look at the domain that the value belongs in. Then you substitute that value in the equation that is associated with that domain.

Given the following piecewise defined function, find the following function values

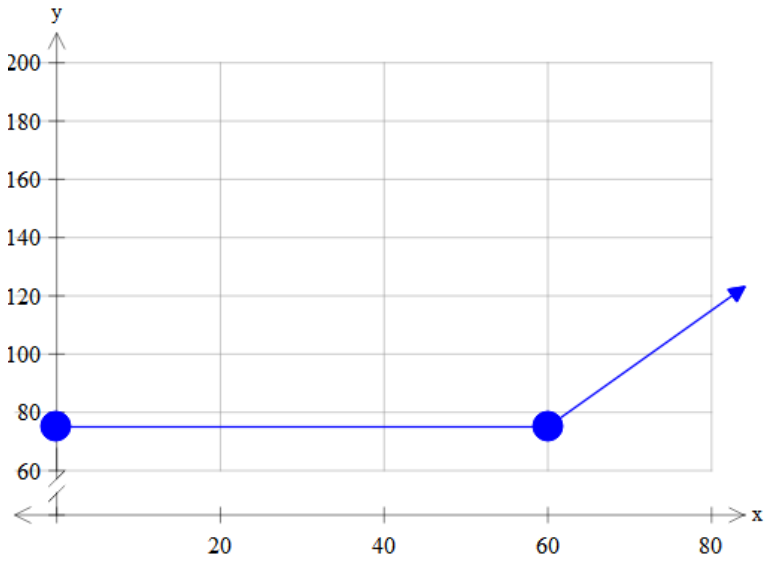
EX1: $f(1) =$

$$f(x) = \begin{cases} 75 & if \quad 0 \le x \le 60 \\ 75 + 2(x - 60) & if \quad x > 60 \end{cases}$$

EX2: $f(60) =$

EX3: $f(65) =$

The graph of a piecewise defined function contains the pieces of different equations. For example the graph of the cell phone piece wise defined function above looks like:

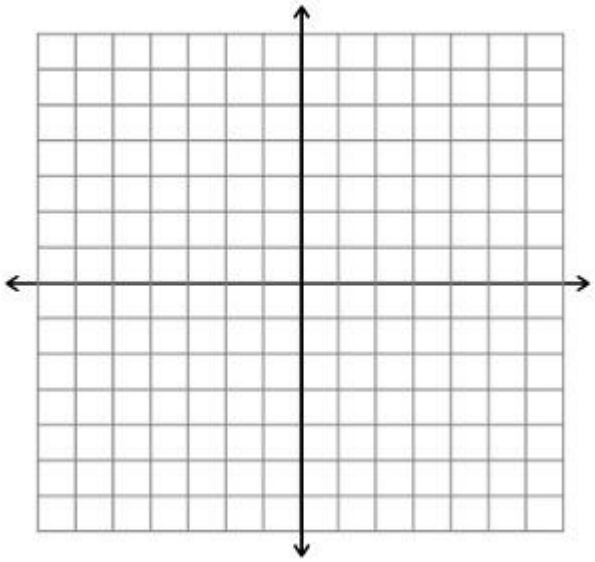


To graph a piecewise defined function:

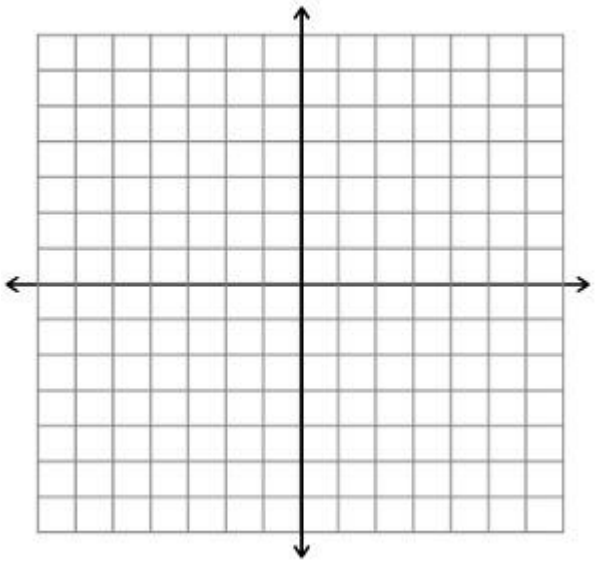
1. Identify all of the change of behavior values (those will be the values where things change in our given domain, for the example above it would be 60)
2. Find the y-values for ALL the functions at that change of behavior value and determine if those points will be open or closed circles, and plot them on your graph.
3. Graph the equations in the piecewise defined function using transformations or functions or our knowledge or graphing lines, but make the graph ONLY appear where the domain states the equation exists.

Graph the following piecewise defined functions.

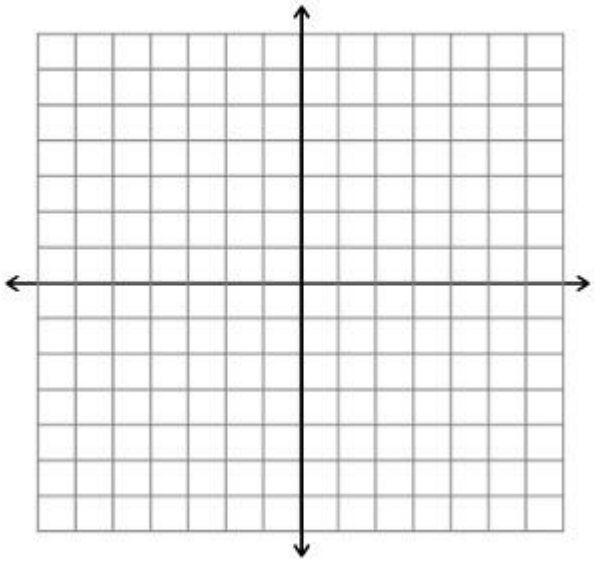
EX1: $f(x)=\begin{cases} -x+1 & if \quad x\le 1 \\ x^2-1 & if \quad x>1 \end{cases}$



EX2: $f(x)=\begin{cases} |x| & if \quad x\neq 0 \\ 2 & if \quad x=0 \end{cases}$



EX3: $f(x)=\begin{cases} 3x & if \quad x<0 \\ \sqrt[3]{x}+1 & if \quad x\geq 0 \end{cases}$



EX4: $f(x)=\begin{cases} -2x+5 & if \quad x<0 \\ 5 & if \quad 0\leq x<4 \\ \sqrt{x-4}+1 & if \quad x\geq 4 \end{cases}$