Mini-Lecture 2.4
Library of Functions; Piecewise-defined Functions

Learning Objectives:

1. Graph the functions listed in the library of functions
2. Graph piecewise-defined functions

Examples: There are no variations from the library of functions in the exercises; this will be done in later sections. Therefore, these examples are of piece-wise functions only, but all of the library of functions are included in them.

1. Sketch the graph of each function.

$$(a)\ f(x)=\begin{cases}2x-1 & \text{if } x>2,\\ 2-x & \text{if } x\le 2.\end{cases} \qquad (b)\ f(x)=\begin{cases}\dfrac{1}{x} & \text{if } x<0,\\ \sqrt{x} & \text{if } x\ge 0.\end{cases}$$

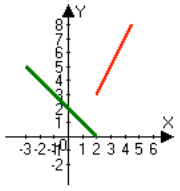
$$(c)\ f(x)=\begin{cases}x^3 & \text{if } x<1,\\ |x| & \text{if } x\ge 1.\end{cases} \qquad (d)\ f(x)=\begin{cases}x^2 & x<0,\\ 1 & x=0,\\ \sqrt[3]{x} & x>0.\end{cases}$$

Teaching Notes:

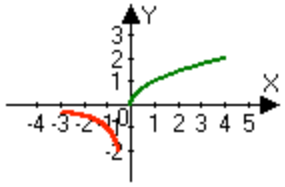
- It is a good idea to have the students memorize the graphs of the functions listed in the library of functions. Plotting points may help them at the beginning, but the graphs should be committed to memory.
- Students often have trouble graphing piecewise functions. If you can show the different parts in different colors, this can help them visualize the way the function is divided.

Answers:

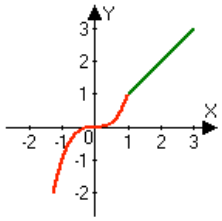
1. (a)



(b)



(c)



(d)