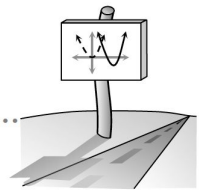
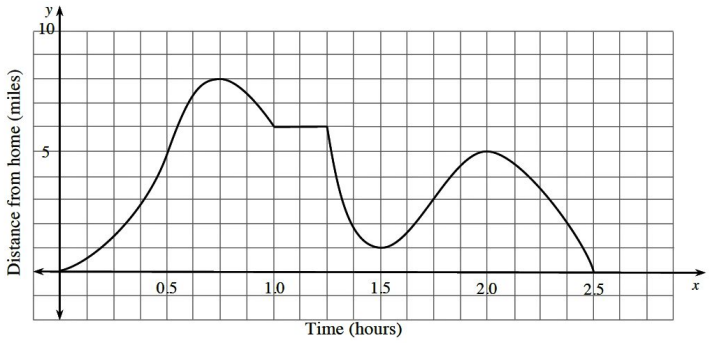
CW#___ Name:_____

2.1.1 What is your best description?

Characteristics of Functions



One day Riley decides to take a scenic drive. The graph below represents Riley's trip.



#2 Consider Riley's distance from home, using the graph above as you answer the following questions. Estimate your answers to the nearest 0.25.

a. When is Riley's distance from home increasing? How is this represented on the graph?

b. When is Riley's distance from home decreasing? How is this represented on the graph?

c. Is Riley's distance from home ever constant? If yes, explain how you know. If no, describe what the graph would look like if the distance was constant over a period of time.

#3 By definition, a function is increasing over the interval $x_1 < x < x_2$ if $f(x_1) < f(x_2)$ for all $x_1 < x_2$. This simply means that when you trace along a graph from left to right, if your finger is moving up, then the function is increasing.

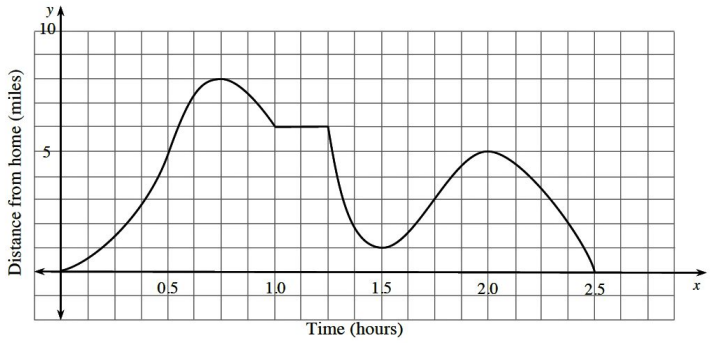
a. In Riley's situation, let $x_1 = 1.5$ and $x_2 = 2.0$. What are $f(x_1)$ and $f(x_2)$? Is $f(x_1) < f(x_2)$?

b. If you choose any two points $x1$ and $x2$ between $x = 1.5$ and $x = 2$, is $f(x_1) < f(x_2)$ for all $x_1 < x_2$? If so, then f is increasing for $1.5 < x < 2$.

c. Sketch an example of a function that has an interval where it is increasing. Label two points on the x-axis x_1 and x_2 such that $x_1 < x_2$. On your graph, is it true that $f(x_1) < f(x_2)$? Explain.

d. Now that you know the definition of an increasing function, write a similar definition for a decreasing function. Include an example sketch. Discuss your definition with your team to verify that your definition is correct.

One day Riley decides to take a scenic drive. The graph below represents Riley's trip.



#4 Points on a graph that are "high" points or "low" points are called extreme points, or extrema. A local maximum/minimum of a function is the largest/smallest value of the function within a small interval around the extreme point. A global maximum/minimum of a function is the largest/smallest value of the function over its entire domain. The plural of maximum is maxima and the plural of minimum is minima.

a. Maxima:

Local: Global:

b. Minima:

Local: Global:

c.Describe the graph near a local maximum point using the words increasing and decreasing. How is it changing?

d. Describe the graph near a local minimum point using the words increasing and decreasing. How is it changing?

#5 Concavity

In mathematics, functions are described as being either "concave up" or "concave down" over given intervals. Intuitively, on a graph, a function is concave up wherever you can trace a "cup" or a u-shaped curve that is right side up. Take another look at Riley's drive.

a. Concave up intervals:

b. Concave down intervals:

c. A point where the concavity of a graph changes is called a point of inflection. Identify the points of inflection.

Points of inflection: