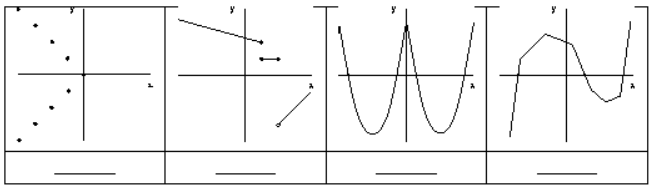
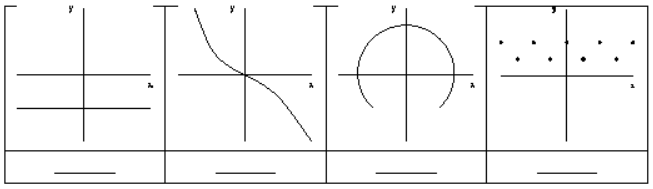
Homework 1.1 – Average Rate of Change

1. **(1 pt) alfredLibrary/AUCI/chapter1/lesson1/function.pg**
Decide whether each of the following 8 graphs represent y as a function of x. If so, type 'yes' under the graph. If not, type 'no' under the graph. Click on the graph to enlarge the image.





2. **(1 pt) alfredLibrary/AUCI/chapter1/lesson1/question10p.pg**

The graph of $y = f(x)$ is given in the figure.

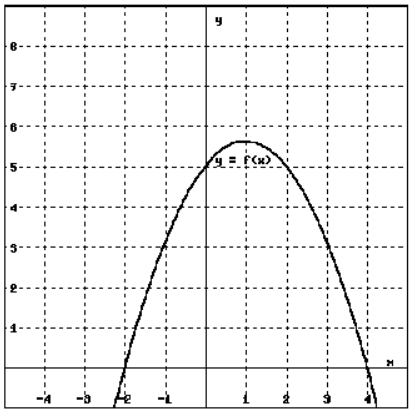
(a) The y-intercept of the graph is the y-coordinate at which the graph touches or crosses the y-axis. It can be found by substituting $x = 0$ into the formula to get $f(0)$. Visually determine the y-intercept.

$f(0) =$ _____

(b) The x-intercepts of the graph are the x-coordinates at which the graph touches or crosses the x-axis. Visually determine the x-intercept(s). If there is more than one, enter them as a comma-separated list.

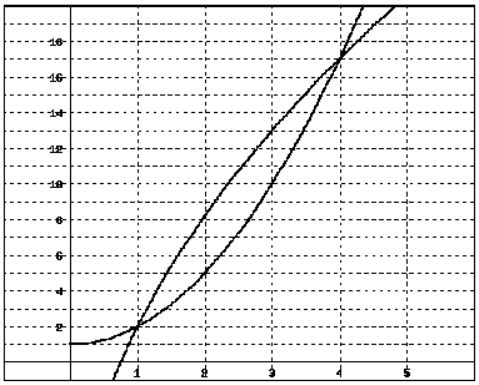
$x =$ _____

(c) A function is positive (greater than zero) on an open interval if the graph lies above the x-axis on that interval. On which interval is $f(x) > 0$?



(Click on graph to enlarge)

3. **(1 pt) alfredLibrary/AUCI/chapter1/lesson1/quiz/question2.pg**



(Click on the graph to get a larger version.)

On the interval [1,4], the average rate of change of the red function is [?] the average rate of change of the blue function.

This problem demonstrates that the average rate of change of a function on an interval does not describe the behavior of the function within the interval.

4. **(1 pt) alfredLibrary/AUCI/chapter1/lesson1/question49p.pg**
According to the 1993 World Almanac, the number of calories a person walking at 3 mph, bicycling at 10 mph, or swimming at 2 mph burns per minute depends on the person's weight as in the following table.

Calories per minute as a function of weight

Weight (pounds)	100	120	150	170	200	220
Walking (calories)	2.7	3.2	4.0	4.6	5.4	5.9
Bicycling (calories)	5.4	6.5	8.1	9.2	10.8	11.9
Swimming (calories)	5.8	6.9	8.7	9.8	11.6	12.7

(a) Use the table to determine the number of calories that a person weighing 220 pounds uses in a half-hour of walking.

_____

(b) The table illustrates a relationship between the number of calories used per minute walking and a person's weight in pounds.

Identify the independent variable(s)

- A. calories used per minute bicycling
- B. weight in pounds
- C. calories used per minute walking
- D. calories used per minute swimming

Identify the dependent variable(s)

- A. calories used per minute walking
- B. weight in pounds
- C. calories used per minute bicycling
- D. calories used per minute swimming

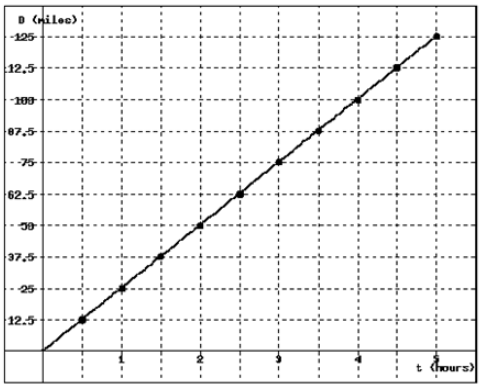
The function described in this relationship is

- A. increasing (getting larger)
- B. decreasing (getting smaller)
- C. constant (staying the same)

---

5. (1 pt) alfredLibrary/AUCI/chapter1/lesson1/question1p.pg

The graph below shows the distance traveled, D (in miles) as a function of time, t (in hours).



(Click on the graph to get a larger version.)

(a) For each of the intervals, find the values of $\triangle D$ and $\triangle t$ between the indicated start and end times. Enter your answers in their respective columns in the table below.

Time Interval	$\triangle D$	$\triangle t$
$t = 1$ to $t = 3$	_____	_____
$t = 1.5$ to $t = 3$	_____	_____
$t = 0.5$ to $t = 3.5$	_____	_____

(b) Based on your results from (a) it follows that the average rate of change of D is constant, and it does not depend over which interval of time you choose. What is the constant rate of change of D ?

$\frac{\triangle D}{\triangle t} =$ _____

Notice that the graph of D is a line and that the average rate of change of D is constant. The average rate of change of a line is used to measure its steepness, or *slope* .

(c) Which of the statements below CORRECTLY explains the significance of your answer to part (b)? Select ALL that apply (more than one may apply).

- A. It is the acceleration of the car over the five hour time interval.
- B. It is the slope of the line.
- C. It is the average velocity of the car over the first two hours.
- D. It is how far the car will travel in a half-hour.
- E. It represents the car's velocity.
- F. It is the total distance the car travels in five hours.
- G. None of the above

Generated by ©WeBWorK, http://webwork.maa.org, Mathematical Association of America