

## Chapter 3 Homework

3.1

A. Fill in the blanks. A function is a \_\_\_\_\_ that assigns \_\_\_\_\_ to \_\_\_\_\_ such that each input goes to \_\_\_\_\_ output. The set of inputs is called the \_\_\_\_\_, and the set of assigned outputs is called the \_\_\_\_\_.

pg 229: 8,14,17,22

B. How is  $f(x)$  read?

pg 229: 28abc,29de,31f,32g,33h,37,40,42,47,50,51,54,56,57,62,70,74,79,85,88,89(label),94,97ab,98

C. Give a real life example of a function. Give its domain and range.

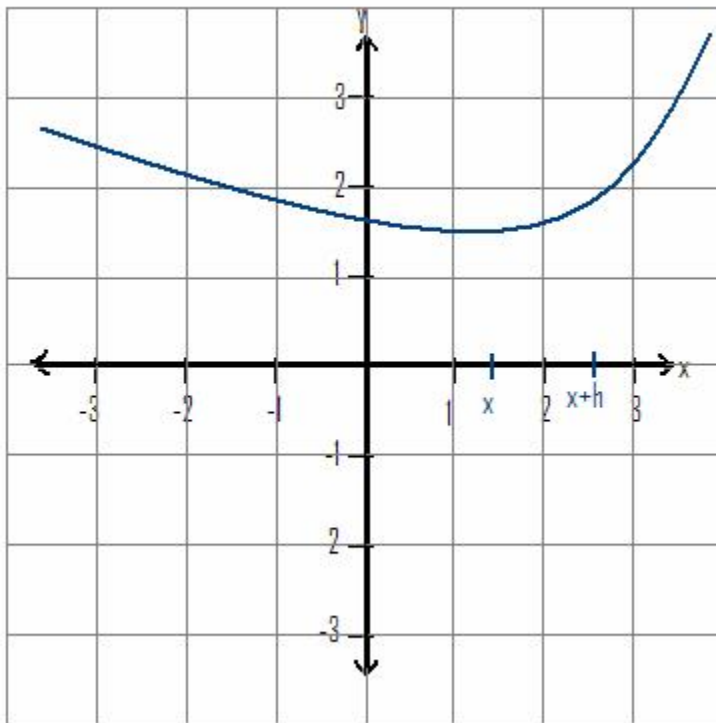
3.2

A. Define the graph of an equation.

pg 236: 4,6-8,9adefgkn

B. Label the following on the graph below. This problem comes up in calculus.

- $f(x)$
- $f(x+h)$
- $(x, f(x))$
- $(x+h, f(x+h))$
- The line segment with length  $h$ .



pg 237: 11,12,14,19

C. Why does the Vertical Line Test work?

pg 237-238: 24,29adef On 29, use TRACE. Part f has 2 answers. Remember to label!

pg 239: 32,33,38

3.3

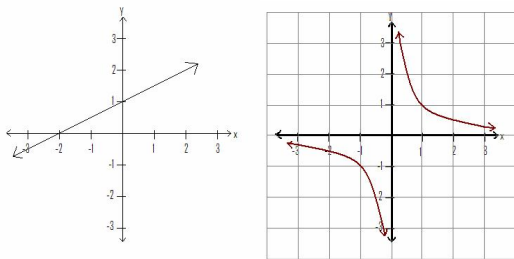
A. How do you tell the difference between the interval  $(a,b)$  and the ordered pair  $(a,b)$ ?

B. Match the following to complete the definitions. The terms refer to a function  $f$ .

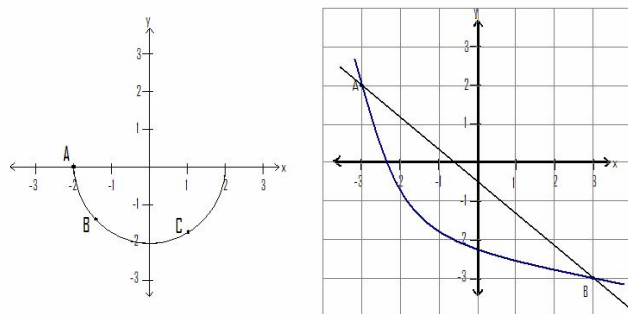
_____ An <b>x-intercept</b>	a. $f(-x) = -f(x)$ for all $x$ .
_____ The <b>y-intercept</b>	b. if $f(x) = k$ for all $x$ .
_____ A function $f$ is <b>even</b>	c. is a solution to $f(x) = 0$ .
_____ A function $f$ is <b>odd</b>	d. $f(x) = f(-x)$ for all $x$ .
_____ A function $f$ is <b>increasing</b>	e. if $x_1 < x_2$ implies $f(x_1) < f(x_2)$ .
_____ A function $f$ is <b>decreasing</b>	f. occurs at $c$ if $f(x) < f(c)$ for all $x$ near $c$ .
_____ A function $f$ is <b>constant</b>	g. connects two points on a graph.
_____ A <b>local maximum</b>	h. is $f(0)$ .
_____ A <b>local minimum</b>	i. if $x_1 < x_2$ implies $f(x_1) > f(x_2)$ .
_____ The <b>average rate of change</b>	j. occurs at $c$ if $f(x) > f(c)$ for all $x$ near $c$ .
_____ A <b>secant line</b>	k. from $c$ to $x$ is $\frac{f(x) - f(c)}{x - c}$ .

pg 248-249: 1,2,4,16,19,24,27,32

C. Find any local maxima or minima.



D. Draw the secant line through B and C on the 1<sup>st</sup> graph. Find the equation of the secant line on the 2<sup>nd</sup> graph.



E. Let  $g(x) = \frac{1}{x+2}$ . Find the ordered pairs  $(1, g(1))$  and  $(2, g(2))$ .

pg 249-250: 45,49-52,58,66,67abd,70,72cdeh,77 (Remember to label on the application problems.)

F. Challenge Problem: (Challenge problems are **optional** and not worth points. They are just for fun!)

Determine whether the following functions are even, odd, neither, or undetermined.

- $\frac{\text{even}}{\text{even}}$  (an even function divided by an even function)
- $\frac{\text{odd}}{\text{even}}$
- $\frac{\text{odd}}{\text{odd}}$
- $\text{even} + \text{even}$
- $\text{odd} + \text{even}$
- $\text{odd} + \text{odd}$
- Create your own functions and investigate their even and oddness.

## 3.4

- A. The functions in these problem are used so often that they should become second nature. **Memorize** what the following graphs look like. Be able to draw their general shape and plot two or three reference points on each. Put a check to show you did it.

$$y = \sqrt{x} \quad y = |x| \quad y = x^3 \quad y = \sqrt[3]{x} \quad y = x \quad y = x^2 \quad y = \frac{1}{x}$$

pg 258-259: 4-24,26

- B. Plot  $y = \text{int}(x)$ .

- C. Find  $\text{int}(5.78)$ ,  $\text{int}(0.004)$ ,  $\text{int}(448)$ , and  $\text{int}(-1.3)$ .

pg 259: 27,29,32,38,39,44,47,52,56,60 (Label on the applications please.)

- D. Use a calculator to graph the piecewise function  $h(x) = \begin{cases} 0.445x - 1.07 & \text{if } x < 1 \\ \frac{2.56}{x} & \text{if } x \geq 1 \end{cases}$ . Indicate what model of

calculator you used. Some graphing calculators may not have this capability.

- E. Challenge Problem: (Challenge problems are **optional** and not worth points. They are just for fun!)

The function  $f(x) = \begin{cases} 0 & \text{if } x \text{ is rational} \\ 1 & \text{if } x \text{ is irrational} \end{cases}$  is important in higher mathematics and is called the “salt and pepper” function.

- a. Find  $f(5.4)$ ,  $f(\frac{7}{11})$ ,  $f(-3)$ ,  $f(\pi)$ ,  $f(0)$ ,  $f(\sqrt{2})$ .

- b. Answer the questions posed in #65 pg 261 but use the salt and pepper function rather than the book’s.

- c. Are there “more” irrational numbers than rational numbers? Are there the same “amount”?

- d. Any guesses how it got its name?

## 3.5

- A. Replacing  $x$  by  $x - h$  does what to the graph of  $y = f(x)$ ?

- B. Replacing  $y$  by  $y - k$  does what to the graph of  $y = f(x)$ ? This is equivalent to replacing the graph with  $y = f(x) + k$ .

- C. Replacing  $x$  by  $ax$  does what to the graph of  $y = f(x)$ ?

- D. Replacing  $y$  by  $ay$  does what to the graph of  $y = f(x)$ ? This is equivalent to replacing the graph with  $y = c f(x)$  where  $c = \frac{1}{a}$ .

- E. Replacing  $x$  by  $-x$  does what to the graph of  $y = f(x)$ ?

- F. Replacing  $y$  by  $-y$  does what to the graph of  $y = f(x)$ ? This is equivalent to replacing the graph with  $y = -f(x)$ .

- G. pg 271-275: 3,5-8,11,12,15,16,20,21,24,25,28,31,35,40,45,50,51,56,58,66ce,71abd,74a,85ab Label please.

- H. Challenge Problem: (Challenge problems are **optional** and not worth points. They are just for fun!)

pg 274: 72,74b