

Ch. 1, 2

09/3/14

*TakeHome Exam #1 – Math 245*

Name: \_\_\_\_\_

Show all work for full credit.

Distinguish answers from work.

---

1.) Solve for  $H$ .

$$S = 2HW + 3LW + 4LH$$

2.) Solve.

$$-0.3(x - 5) + \frac{2}{5}(x - 6) = 0.1x - 0.9$$

**3.) Determine the number of distinct solutions and tell whether they are rational, irrational, or nonreal complex numbers.**

$$2x^2 + 1 = x$$

**4.) Solve.**

$$\sqrt{x+2} + \sqrt{3x+17} = 1$$

**5.) Write in standard form.**

$$(2i)^3 + i^{10} + 6i^{36}$$

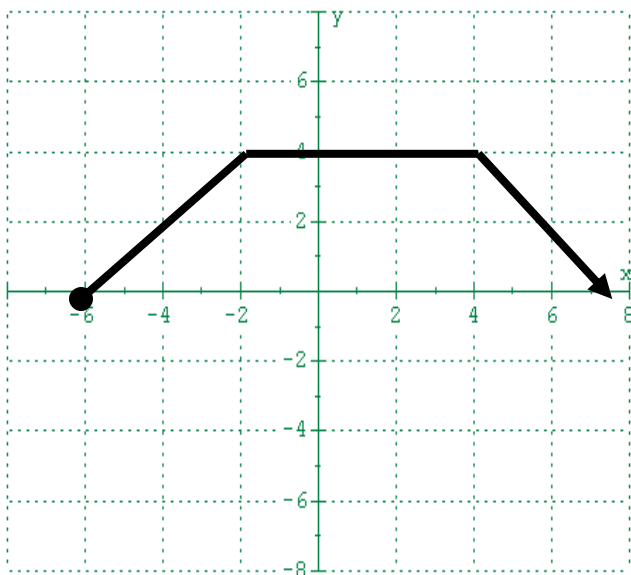
**6.) Joe traveled against the wind in a small plane for 3hrs. The return trip with the wind took 2.8hrs. Find the speed of the wind if the speed of the plane in still air is 180mph.**

7.) A ball is kicked from ground level with an initial velocity of 16 feet per second. Neglecting air resistance, the function that describes its height in feet  $t$  seconds after it is kicked is given by

$$s(t) = -16t^2 + 16t$$

Find the time(s) that the ball will reach a height of 80ft.

8.) Use the graph of the function below to answer the following:



a. State the Domain.

b. State the Range.

c. Find  $f(-1)$

d. Determine the interval where the function is constant.

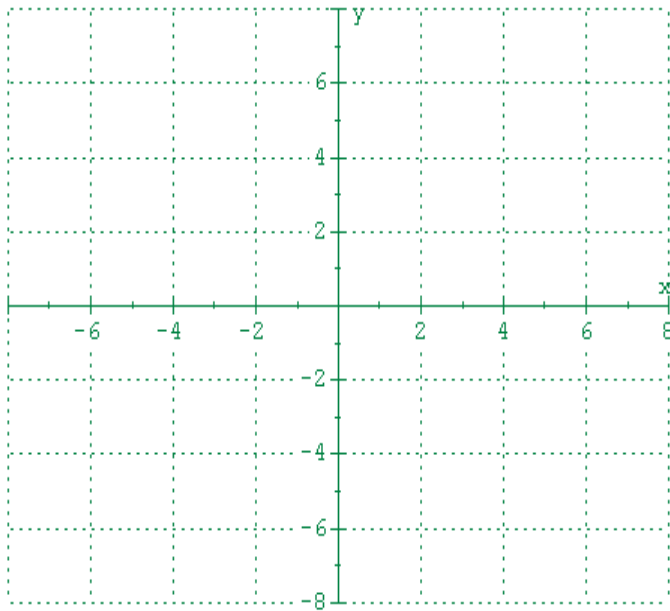
e. Determine the interval where the function is increasing.

f. Determine the interval where the function is decreasing.

9.) In 1991, sales of VCRs numbered 16.8 million. In 1996, sales of VCRs were 13.3 million. Find the average rate of change in VCR sales, in millions per year. Give a written description of the result.

10.) If  $m = -\frac{5}{3}$  and point  $(-1, 5)$ , find the following:

a. Graph the line with given slope and passes through the given point.



b. Write the equation of the line in standard form.

**11.) Find  $k$  so that the line that passes through  $(2, 6)$  and  $(-4, k)$  is perpendicular to  $2x - 3y = 4$**

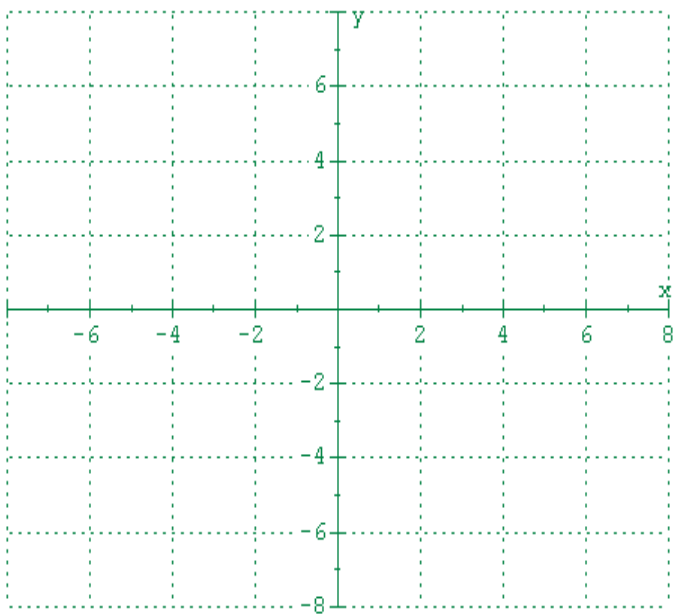
**12.) A circle has diameter with endpoints  $(-1, 3)$  and  $(5, -9)$ . Find the equation of the circle in the form of  $(x - h)^2 + (y - k)^2 = r^2$**

13.) Determine whether the function is even, odd or neither. Also discuss the symmetry of the graph.

$$f(x) = x^5 + x$$

14.) Given the function  $f(x) = |x|$  write and graph the function with its indicated transformation.

Reflection about the x-axis, Shifted up 3 units, Shifted to the right 2 units, Vertical shrink by a factor of 0.5,



15.) Simplify each expression. Write your final answer without negative exponents.

a.  $\frac{x^2}{x^2 - 4} - \frac{x + 1}{x + 2}$

b.  $\left(\frac{3x^{3/2}y^3}{x^2y^{-1/2}}\right)^{-3}$

16.) Factor each expression completely.

a.  $x^3 - 3x^2 - 4x + 12$

b.  $\frac{x}{2}(64 - x^2)^{-1/2}(-2x) + (64 - x^2)^{1/2}$



17.) Mark drove from Los Angeles to Rosarito at a speed of 50mph. On the way back, he drove at a rate of 60mph. The total trip took  $4\frac{2}{5}$  hours of driving time. Find the distance between the two cities.

18.) Solve.

$$\sqrt{3 - \sqrt{x + 5}} = 2$$

**19.) Solve.**

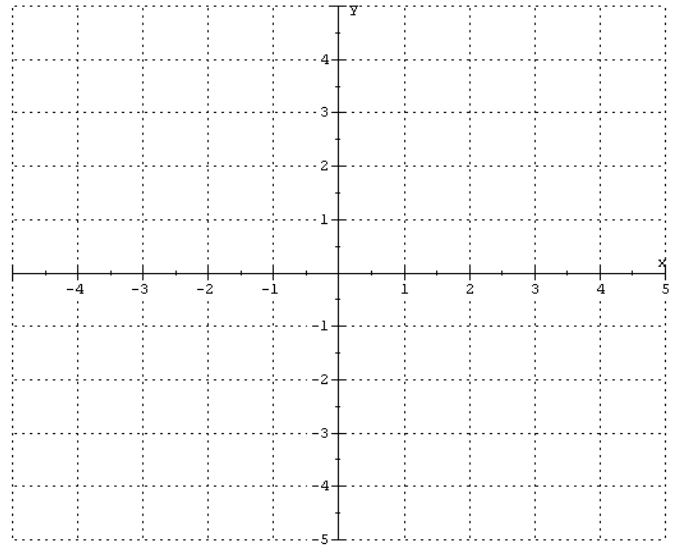
$$\frac{2x-3}{x+1} \leq 1$$

**20.) Given the equation  $x = y^2 - 4$**

**a. Find the  $x$  and  $y$ -intercepts.**

**b. Determine the symmetry of the graph of the equation, if any.**

21.) Given  $x^2 + 6x + y^2 - 2y + 6 = 0$ , determine the center and radius of the circle and sketch the graph.



22.) The monthly cost of driving a car depends on the number of miles driven. Lynn found that in the month of May her driving cost was \$380 for 480 miles and in the month of June her driving cost was \$460 for 800 miles. Assuming that the relationship is linear, find the following:

a. The linear relationship that relates cost ( $C$ ) to driving distance ( $d$ ). (Write the cost as a function of the distance.)

b. What does the y-intercept and slope represent?

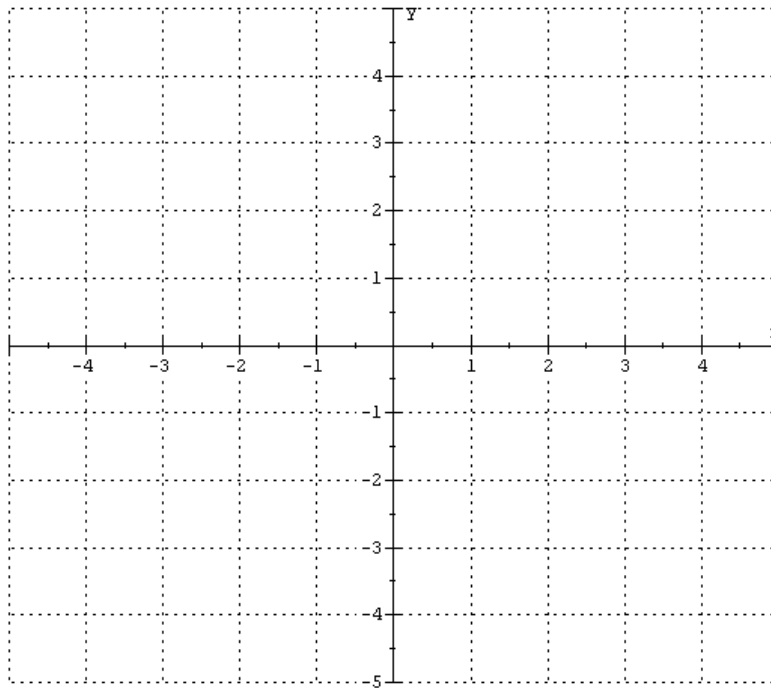
23.) Given the function  $f(x) = \begin{cases} x^2 - 1 & x \leq 1 \\ 2x + 1 & x > 1 \end{cases}$ , determine the following

a. Sketch the Graph

b. Domain

c. Range

d.  $f(1), f(6)$



24.) If  $f(x) = -3x^2 + 4x - 5$ , find the difference quotient.  $\frac{f(x+h) - f(x)}{h}, h \neq 0$

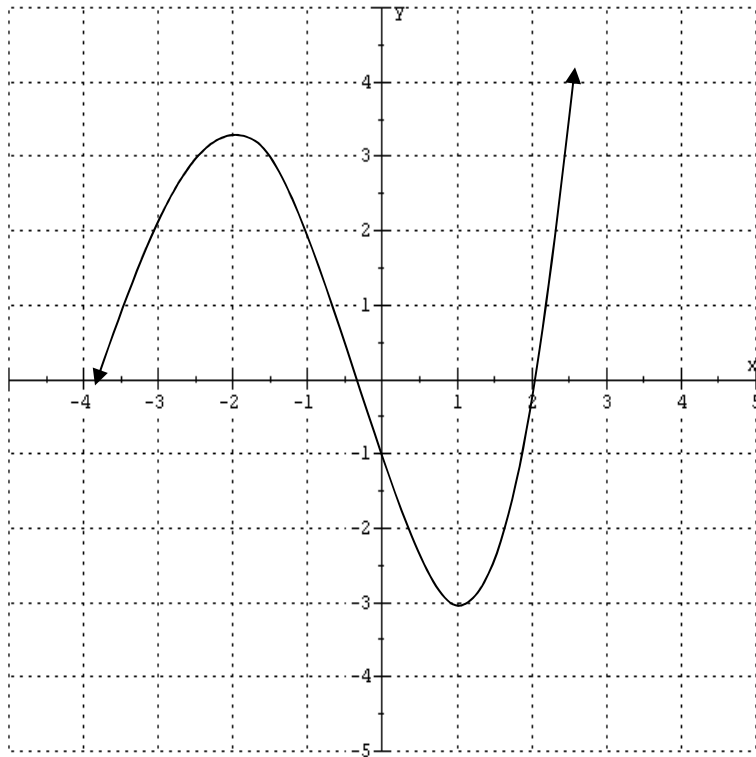
25.) If  $f(x) = \frac{2x}{x-1}$ , find the difference quotient.  $\frac{f(x+h) - f(x)}{h}, h \neq 0$

26.) Determine the domain of each function.

a.  $f(x) = \frac{x}{x^2 + x - 6}$

b.  $f(x) = \frac{\sqrt{x+2}}{3-x}$

27.) Given the graph of a function below, determine the following:



a. Where is  $f(x)$  increasing?

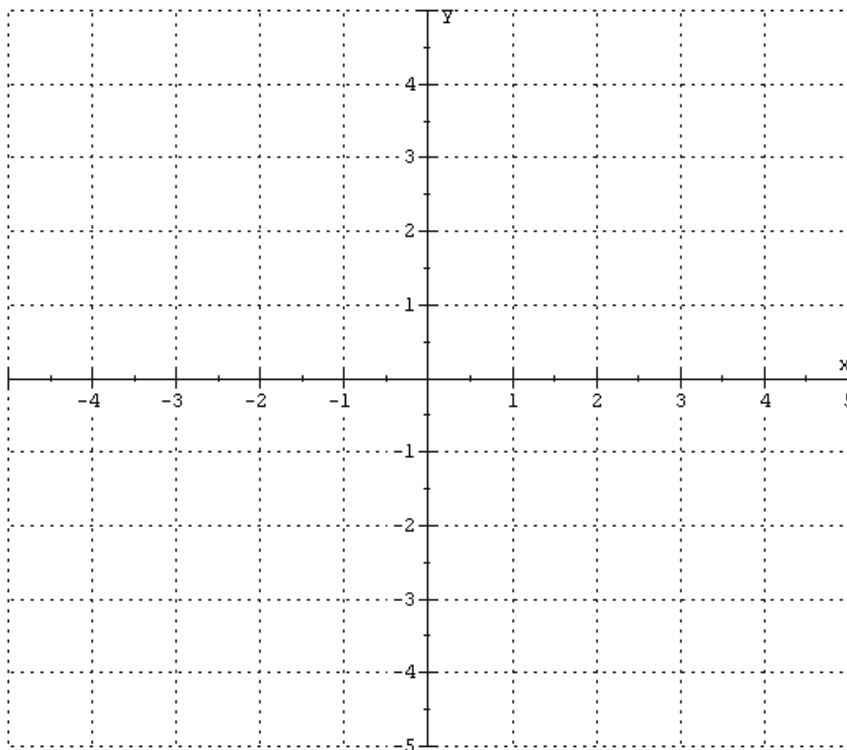
b. Where is  $f(x)$  decreasing?

c. Local Maximum.

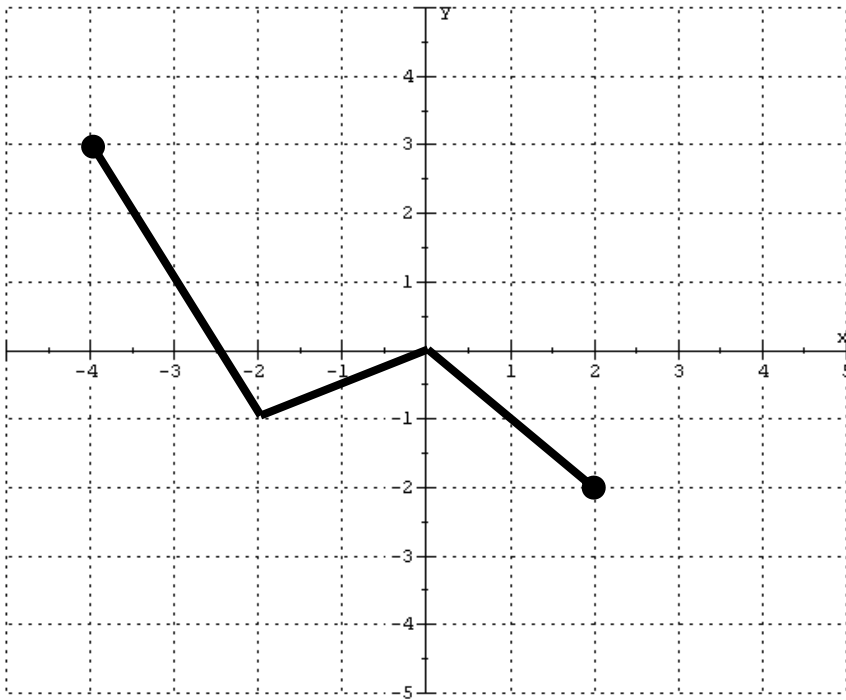
d. Local Minimum.

e. Find the average rate of change between  $x = -3$  and  $x = 2$

28.) Use the parent function  $f(x) = \sqrt{x}$  to sketch the graph of  $g(x) = -2f(x+1) - 3$



29.) Given the function of  $f(x)$  below, graph  $g(x) = f(-0.5x)$ .



30.) If 1800 ft of fencing is available to build five adjacent pens, express the total area of the pens as a function of  $x$  and determine the value of  $x$  that will maximize the total area.

31.) Given  $f(x) = \sqrt{x-3} + 4$ , find  $f^{-1}(x)$  and state its domain and range, if it exists.

32.) Given the functions  $f(x) = x^2 - 3x + 2$  and  $g(x) = x - 5$ , find the following:

a.  $(f \circ g)(x)$

b.  $(g \circ f)(2)$