

READ THESE DIRECTIONS BEFORE STARTING

- ❖ Write your name below on the space provided.
- ❖ This test has a total of 6 pages.
- ❖ Work the problem in the space provided. If you need more space, write on the back of the test.
- ❖ To insure maximum credit, show your work. In general, full credit will not be given for unsupported answers.
- ❖ Look only at your test. Don't give me the impression that you are cheating.
- ❖ Be sure to write neatly and in pencil. If I cannot read what was written, do not expect the problem to be graded.
- ❖ If you finish early, go over the test again.

Good luck!

Number	Maximum	Score
1	4	
2	2	
3	9	
4	4	
5	5	
6	12	
7	12	
8	5	
9	12	
10	6	
11	2	
12	3	
13	8	
14	6	
15	10	
Total	100	

Name \_\_\_\_\_

Circle final answers

1) (4 points) Find the equation of the circle in standard form where the points  $(7,6)$  and  $(-5,1)$  are endpoints to a diameter of the circle

2) (2 points) What is a function?

3) (3 points each) Find the domain of the following functions:

a)  $f(x) = 2x^2 + 26x + 24$       b)  $g(x) = \frac{2x+5}{2x^2-3x-14}$       c)  $h(x) = \frac{-4x+4}{\sqrt{9x+3}}$

4) (4 points) In class we discussed two of the three things you cannot do with real numbers. What were the first two and how do they help you find the domain of a function? Do not use examples in your answer.

5) (5 points) The function  $f(x) = -2x^2 + 23x + 20$  approximates the number of new words learned by a student in an Pig Latin 101 class where  $x$  is the number of weeks since the beginning of the semester. Find and interpret the average rate of change from  $x = 2$  to  $x = 8$ .

6) (3 points each) Consider the following data (source: Census.gov):

Year	2010	2011	2012	2013	2014	2015	2016
Percentage of people 25 years or older that have completed 4 years of college or more	29.9	30.4	30.9	31.7	32.0	32.5	33.4

Let  $x$  be the number of years since 2010 and let  $y$  be the percentage of people 25 years or older that have completed 4 years of college or more.

a) Find the equation of the regression line. Round values to two decimal places:

b) Interpret the slope and  $y$ -intercept using the language of the problem:

c) Predict the percentage of people that completed more than 4 years in the year 2017:

d) When will 40% of people 25 or older have completed 4 or more years of college?

7) (2 points each) For the given graph, find the following. Write parts  $a - d$  in interval notation. For parts  $c$  and  $d$ , write in terms of  $x$ . For parts  $e$  and  $f$ , write answer as an ordered pair.

a) The Domain

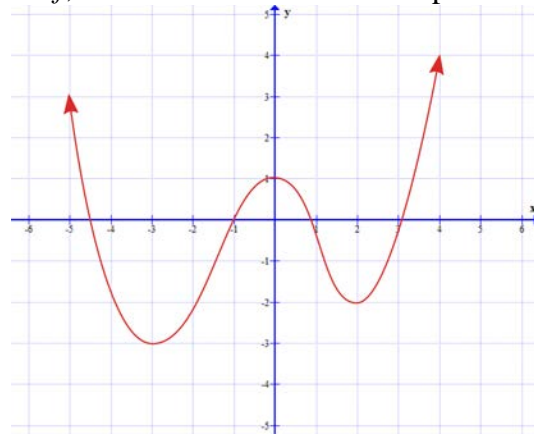
b) The Range

c) Increases

d) Decreases

e) Relative Maxima

f) Relative Minima



8) (5 points) A farmer has 600 feet of fence and wishes to enclose 4 adjacent rectangular pens that are all next to a river. The side against the river will not receive any fencing. Determine a function for the area of the entire enclosure in terms of the width  $x$  of the enclosure.



9) (3 points each) For the functions  $f(x) = \sqrt{x+4}$  and  $g(x) = x^2 - 4$ , find...

a)  $(f + g)(x)$

b) The domain of  $(f - g)(x)$

c)  $(g \circ f)(x)$

d) The domain of  $(g \circ f)(x)$

10) (6 points) For the function  $f(x) = 2x^2 + 2x - 5$ , find and simplify  $\frac{f(x+h) - f(x)}{h}$ :

11) (2 points) Find two function  $f$  and  $g$  such that  $f \circ g = H$  given that  $H(x) = \sqrt[4]{8x^2 + 6} - 5$ :

12) (3 points) Determine algebraically if the function  $f(x) = 12x|x|$  is even, odd, or neither.

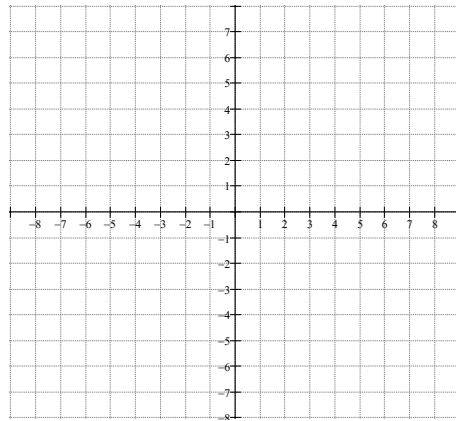
13) (2 points each) The ordered pair  $(2, -9)$  is on the graph of  $y = f(x)$ . Find the corresponding ordered pair on the graph of  $y = g(x)$  where...

- a)  $g(x) = f(x) + 5$       b)  $g(x) = \frac{4}{3}f(x)$       c)  $g(x) = f(x-3)$       d)  $g(x) = f(-x)$

14) (3 points each) For the function  $f(x) = -\sqrt{x+3} + 4 \dots$

a) Explain, in order, the steps needed to sketch the graph:

b) Sketch and label the graph:



15) (1 point each) Match the following functions with the best description or picture:

\_\_\_\_\_ Constant

\_\_\_\_\_ Linear

\_\_\_\_\_ Identity

\_\_\_\_\_ Cube

\_\_\_\_\_ Square

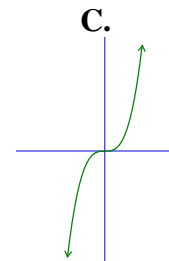
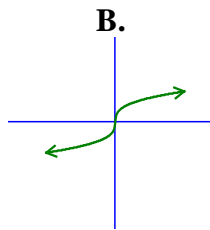
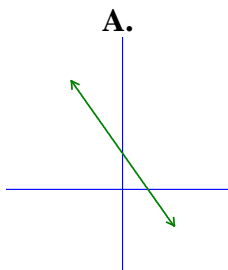
\_\_\_\_\_ Square root

\_\_\_\_\_ Cube root

\_\_\_\_\_ Reciprocal

\_\_\_\_\_ Piecewise-defined

\_\_\_\_\_ Absolute value



**D.** The graph bisects the first and third quadrants

**E.** Has vertical and horizontal asymptotes at the  $x$ - and  $y$ -axis

**F.** The graph is half of a parabola

**G.** Made up of other functions

**H.** Same  $y$ -value for all  $x$  values

**I.** The graph is a V-shaped curve

**J.** The graph is a U-shaped curve