Honors Pre-Calculus Student Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Unit 1 – Study Guide Block: \_\_\_\_\_\_\_\_\_\_

**Please show all work on a separate sheet of paper! Write your answers ONLY on this sheet!**

1. If *f(x)* contains the coordinate (2,-3), give the coordinate that would have the following relationship to *f(x)*.

a. *f(x)* is even: b. *f(x)* is odd: c. *f-1(x)*:

2. State the domain in interval notation. Justify your answer algebraically, but confirm it using a graphing calculator.

a) $f\left(x\right)= \frac{x}{x^{2}-25}$ b) $g\left(x\right)= \sqrt{x+3}$ c) $h\left(x\right)= \frac{x-7}{\sqrt{x+1}}$ d) $m\left(x\right)= \frac{\sqrt{x+3}}{x-4}$

3. Determine if the function is even, odd or neither. Justify your answer algebraically, but confirm it using a graphing calculator.

a) $f\left(x\right)=6x^{4}-x^{5}$ b) $w\left(x\right)= \sqrt{x^{2}-1}$ c) $h\left(x\right)= \frac{3}{x^{3}+x}$

4. Given: $f\left(x\right)=x+1$ , $g\left(x\right)= \sqrt{x+2}$ and $h\left(x\right)= x^{2}-1$, find each of the following. Be sure to state any excluded values when appropriate.

a) $(g ⃘f)(x)$ b) $f(g\left(14\right))$ c) $\left(\frac{f}{h}\right)(x)$ d) $(f-h)(x)$

5. Given: $f\left(x\right)= \left\{\begin{array}{c}\left|x\right|, x<1\\3, 1\leq x\leq 2\\x+1, x>2\end{array}\right.$ a) Graph

Evaluate

b) $f(4)$

c) $f(1)$

d) $f(-2)$

6. Use the given function to answer the questions that follow:

a) State the domain in interval notation.

b) State the range in interval notation.

c) State the interval(s) where *f(x)* is increasing.

d) State the interval(s) where *f(x)* is decreasing.

e) State the interval(s) where *f(x)* is constant.

f) Is *f(x)* a function? Justify your answer.

g) State at what x-values the function is discontinuous. For each answer, describe the type of discontinuity.

7. Name the function and describe each transformation.

a) $f\left(x\right)= -3\sqrt{x+4}$ c) $w\left(x\right)= -\left(x+2\right)^{3}-1$

b) $g\left(x\right)= (x+1)^{2}-3$ d) $p\left(x\right)= \left|x+1\right|-2$

8. Complete each sentence:

a) Even functions have symmetry about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

b) Odd functions have symmetry about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

c) Inverse functions have symmetry about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

9. Given $f\left(x\right)= x^{3}$, write the equation of $g(x)$ if $g\left(x\right)=2f\left(x-3\right)+1$

10. Find the value of *c* that would make *f(x)* continuous. $f\left(x\right)= \left\{\begin{array}{c}cx^{2}-x+1, x<-2\\cx+3, x\geq -2\end{array}\right.$

11. Use compositions of functions to prove whether $f\left(x\right)= \frac{x-3}{2}$ and $g\left(x\right)=2x+3$ are inverses.

12. Given $f\left(x\right)= -0.4x^{4}-0.5x^{3}+0.8x^{2}-2$, find:

a) Increasing interval(s)

b) Decreasing interval(s)

c) Local maximum(s)

d) Local minimum(s)

e) Zero(s)

13. Find $f^{-1}\left(x\right)$ of each:

a) $f\left(x\right)= \frac{2x+3}{5x-2}$ b) $f\left(x\right)= \sqrt[3]{x+2}-1$

14. If f(x) is graphed below, graph g(x) = 2f(x) – 3 using a different color.

15. To get the function g(x), we start with the function f(x), reflect it horizontally, shrink it horizontally by a factor of 1/3, and shift it down 3. Find g(x) in terms of f(x).

16. a) If (f/g)(x) = 2x and g(x) = 4x2, what is f(x)? b) If f(g(x)) = √(x2 + 4), and f(x) = √x, what is g(x)?

c) If f(g(x)) = (3x2)3, what could f(x) and g(x) be?

17. Does the following function have an inverse that is a function? Explain algebraically and graphically.

 f(x) = 2x4 - 3

18. Graph the following function:



