PreCalculus KC 1 Review (Functions)   Name:_____

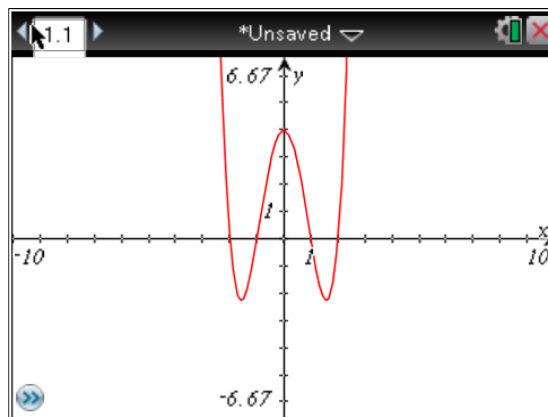**Non-Calculator**

1) Using the graph of $f(x)$ on the right:
    a) estimate the value(s) of the relative max and min.

    b) write the end behavior using limit notation.

2) Find the domain and range of the following:
    a) $f(x) = \sqrt{x-1} + 3$ b) $k(x) = \sqrt{-2x+1}$

3) Find $(f \circ g)(x)$ and $(g \circ f)(x)$ if $f(x) = x^2 - 7$ and $g(x) = \sqrt{x+3}$. Then, write the domain of each.
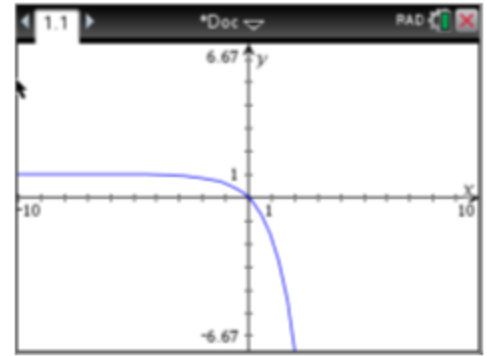
4) Find $f(g(2))$ and $g(f(-1))$ if $f(x) = 2x - 5$ and $g(x) = x^2 + 3x - 1$.

5) Find the inverse of:
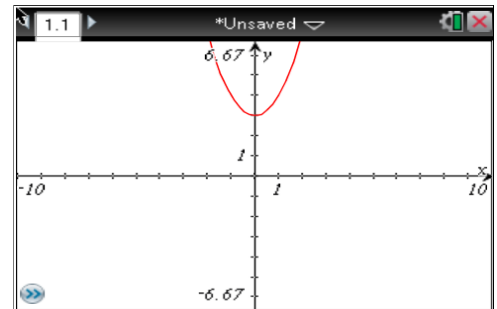   a) $f(x) = 4x - 8$ b) $h(x) = (x-3)^2 + 9$

6) Using your knowledge of parent functions and transformations, write the function that produces the graph on the right.

7) Using your knowledge of parent functions and transformations, write the function that produces the graph on the right.


8) Sketch a graph of 3 functions that are NOT continuous over the Real Numbers.

9) Sketch a graph of 3 functions that are decreasing on the interval $(-\infty, 0)$.

10) Sketch the following:
   a) graphs of 3 functions that are bounded below
   b) graphs of 2 bounded functions
   c) a graph of a function that's NOT bounded

11) Describe the transformation of $q(x) = (x - 3)^2 - 5$ from its parent function. Then, sketch and label the graph of the function.
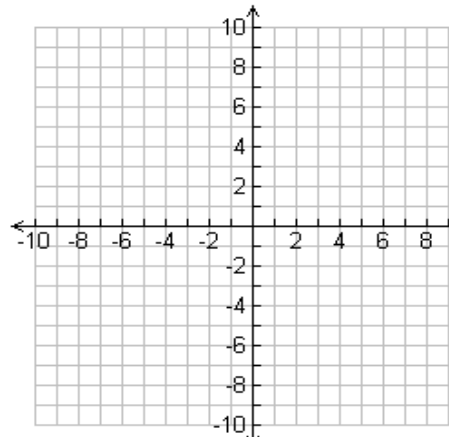
Calculator

12) Find the zeroes of $f(x) = x^2 - 5x + 3$. What is the domain and range of this function?

13) Using limit notation, write the end behavior of $f(x) = 3x^3 - 26x^2 + 61x - 30$.

14) Determine to 3 decimal places the interval(s) on which the function in problem 13 is decreasing and increasing.

15) Perform the following transformation: Reflect $q(x)$ across the x-axis if $q(x) = (x - 3)^2 - 5$. Write the new function and call it $p(x)$.

16) What is the best fit regression curve, given the data on the right? Write the regression model.

# of minutes	3	4	5	6	8
# of cars	8	15	24	35	63

17) Graphite Inc. makes tennis racquets. If each racquet costs $53 to make with fixed overhead costs of $567,000, what is the best fit regression curve? Write a function that models the cost of producing x rackets.

18) Is the function below continuous over the real numbers? If not, state the x-value(s) where the discontinuity occurs and tell whether the discontinuity is removable or non-removable.

$$f(x) = \frac{x(x^2-4)}{x^3-2x^2-8x}$$

19) Tell whether each of the following functions is odd, even, or neither:

a) $f(x) = \frac{x^3}{4-x^2}$

b) $g(x) = x^2 - 3$

c) $h(x) = x^2 - 2x - 2$

*For part c, support your answer algebraically!