Name: _____   Period: _____   Date: _____

PreCalculus Chapter 2 Practice Test

Answer the following questions. No work is necessary unless it is specified.

1. Define function.

2. Let $f(x) = 2x^2 + 8x - 1$. Evaluate each function value.

      a. $f(1)$ b. $f(3)$ c. $f(10)$ d. $f(a)$ e. $f(x^2)$

3. For the same function $f(x)$ from #2,

    a. Find its domain.

    b. Complete the square and write it in the vertex form: $f(x) = a(x - h) + k$

    c. Find its vertex and determine whether it's a maximum or a minimum point.

   d. Describe the graph's change (shift, stretch, compress, etc.) from $f(x) = x^2$

4. Let $f(x) = x^2 - 4x - 5$

   a. Find its domain.

   b. Find the vertex and determine whether it is a maximum or a minimum point.

   c. Find the x and the y intercepts.

   d. Use the vertex and the intercepts to sketch the graph the function.

5. Write the following equation for y in terms of x: $3x + 4y = 2$

6. Write the following equation for x in terms of y: $x - 2y - 3 = 0$

7. Use the graph to state the intervals in which the function is increasing, decreasing, and neither.
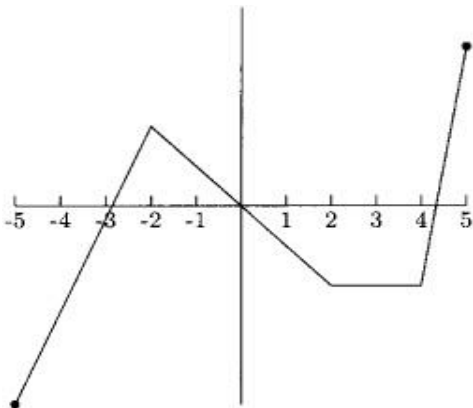
8. For the function $f(x) = 3x - 2$, determine the average rate of change between $x = 2, and\ x = 3$.

9. Determine whether the following functions are one-to-one. If they are, find their inverse function.

     a. $f(x) = -2x + 4$ b. $f(x) = \sqrt{x}$

     c. $g(x) = x^2 - 2x$ d. $h(x) = x^3 + 8$

10. Let $f(x) = x - 3$ and $g(x) = 4x^2$. Find $f + g, f - g, fg, \frac{f}{g}, f \circ g, g \circ f$

11. Use $f(x) = 3x - 5$ and $g(x) = 2 - x^2$ to evaluate the following expressions.

     a. $(f \circ g)(0)$ b. $(f \circ g)(2)$ c. $(f \circ f)(3)$ d. $(g \circ f)(1)$

12. (T or F) Only one-to-one functions can have an inverse function.

13. (T or F) If a graph stretches vertically, then it also stretches horizontally.

14. (T or F) The set of all inputs (domain) of a function becomes the set of all outputs (range) for the inverse function.

15. (T or F) You can test for one-to-one-ness of a function using the vertical line test.

16. The effectiveness of a television commercial depends on how many times a viewer watches it. After some experiments an advertising agency found that if the effectiveness E is measured on a scale of 0 to 10, then $E(n) = \frac{2}{3}n - \frac{1}{90}n^2$, where n is the number of times a viewer watches a given commercial. For a commercial to have maximum effectiveness, how many times should a viewer watch it?

17. A gardener has 240 feet of fencing to fence in a rectangular vegetable garden. Find the dimensions of the largest area she can fence. What is the maximum area?

18. A hockey team plays in an arena with a seating capacity of 10,500 spectators. With the ticket price set at $10, average attendance at recent games has been 9000. A market survey indicates that for each dollar the ticket price is lowered, the average attendance increases by 1000.

a. What ticket price is so high that no one attends, and hence no revenue is generated?

b. Find the price that maximizes revenue from ticket sales.

19. A rectangular building lot is three times as long as it is wide. Find a function that models its area A in terms of its width *w*.

20. Find a function that models the radius *r* of a circle in terms of its area *A*.

21. Find a function that models the area *A* of a circle in terms of its circumference *C*.

22. Two ships leave port at the same time. One sails south at 15mi/h and the other sails east at 20mi/h. Find a function that models the distance *D* between the ships in terms of the time *t* (in hours) elapsed since their departure.