SEMESTER EXAM REVIEW

1. Sketch a possible graph over the interval [4, 4] for a function g that has the stated properties.

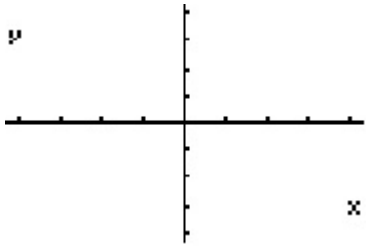
is defined

exists

is not continuous at x = 1

does not exists

is not differentiable at $x = 3$, but is continuous



2. Determine the value of k such that the function h is continuous everywhere.

3– 4. Find the limit as a number, , or does not exist. Show supportive work. Place answer on the line provided.

3. 4.

5 – 6. If and , find:

5. 6.

7 – 9. Given:

7. State the *x – value* , if any, at which h is not continuous.
8. State where the removable discontinuity occurs, if any.
9. State the equation of the vertical asymptote(s), if any, of the graph .

10. Multiple Choice: If , which of the following will calculate the derivative of ?

A. B.

C. D. E. None of these

11 – 12. The tangent line to the graph of $y = h (x)$ at the point passes through the point (2 , 4). Find:

11. $h(4)$ 12.

13. Find an equation for the tangent line to the graph of *at the point where* $x = 1$.

14. Find implicitly:

15. A point moves along the curve in such a way that the y – *value* is decreasing at the rate of 2 units per second.

At what rate is x changing when ? Work must be shown.

Given Rate: _____

Find: _____

is changing at a rate of _____

16. In words, what is a derivative?

17 – 18. Find all critical numbers, if any, of the function.

19. The derivative of $y = f(x)$ is given as . At what value(s) of x does the graph of f have a relative minima _____ and a relative maxima _____ .

20. Sand being emptied from a hopper at the rate of 10 forms a conical pile whose height is always twice its radius. At what rate is the radius of the pile increasing when its height is 5 feet?

Given Rate : *Equation:*

Find: