## Math 1314 – ONLINE Alternate Assignment 5

Record your answers to these questions on the Alternate Assignment 5 answer sheet and upload your answers to the Alternate 5 slot on the "Assignments" tab at casa.uh.edu. This assignment is due on Saturday, February 16, 2013, at 11:59 p.m. All work must be submitted electronically. Late work will not be accepted.

- 1. Write down the formula that gives the slope of the tangent line to the graph of a function f.
- 2. What is another name for the slope of the tangent line?
- 3. How does the average rate of change formula differ from the slope of the tangent line formula (limit definition)?
- 4. State the power rule, and use it to find the derivative of  $f(x) = x^7$ .
- 5. Find the derivative of each of these functions: f(x) = 7x, g(x) = -9x,  $h(x) = \frac{3}{2}x$ . Then state a generalization for finding the derivative of any function of the form f(x) = ax.

6. Find the derivative of 
$$f(x) = \frac{2}{3}x^3 - \frac{5}{2}x^2 + 6x - 5$$
.

- 7. Find the derivative of  $f(x) = 3x^2 6x + 8$ . Then use it to find f'(-3).
- 8. Use GeoGebra to find f'(2.5) if  $f(x) = \frac{2x^2 + 5e^{2x}}{3x^2 + 12}$ .
- 9. Write an equation of the line that is tangent to  $f(x) = 2x^2 3x + 5$  when x = 1.
- 10. How do you find the rate at which a function is changing when x = 3?
- 11. We typically rescale data given in years so that the numbers used for x are small. Suppose t = 0 corresponds to the beginning of 2003. What value would you use for *t* to represent the beginning of 2011?
- 12. How can you tell the difference between a "function value" problem and a "rate of change" problem?

Use this information to answer questions 13 - 18: Revenue realized from online sales can be modeled by the function  $R(t) = 0.0312t^3 + 0.076t^2 + 1.78t + 4.65$  where R(t) is given in billions of dollars and *t* is given in years since the beginning of 2000.

- 13. Suppose you are asked to find the total revenue realized from online sales as of the beginning of 2010. Is this a function value, rate of change or average rate of change problem?
- 14. Find the total revenue realized from online sales as of the beginning of 2010.
- 15. Suppose you are asked what the average annual change in revenues from online sales was from the beginning of 2002 to the beginning of 2008. Is this a function value, rate of change or average rate of change problem?
- 16. Find the average annual change in revenues from online sales was from the beginning of 2002 to the beginning of 2008.
- 17. Suppose you are asked to state how fast revenues from online sales were increasing at the beginning of 2007. Is this a function value, rate of change or average rate of change problem?
- 18. How fast were revenues from online sales increasing at the beginning of 2007