Review Problems

November 3, 2016

- 1. (Fall 2015, Exam 3, #1) A spherical balloon is inflated at a rate of 8 cubic centimeters per second. Find the rate at which the radius is increasing when the radius is 5 centimeters. *Hint: Volume of a sphere*, $V = \frac{4}{3}\pi r^3$
- 2. (Fall 2005, Exam 3, #11) Given the graph of the derivative function f' to the left, we may conclude which of the following?
 - (a) f(c) < 0
 - (b) f has a local maximum at c
 - (c) f is not differentiable at c
 - (d) f is increasing to the left of c
 - (e) f has an inflection point at c



- 3. (Fall 2003, Exam 3, #2) The derivative of a function g is $g'(x) = \sin x \sin 2x$, so that x = 0 and $x = \pi/3$ are critical numbers of g. Determine whether f has a local maximum, minimum, or inflection point at x = 0 and $x = \pi/3$.
- 4. (Fall 2003, Exam 3, #12) What is the total number of local maxima, local minima, and inflection points in the graph of $f(x) = \frac{1}{1-x^2}$?
- 5. (Fall 2002, Exam 3, #4) Let $f(x) = xe^x$. Find asymptotes, intervals of increase and decrease, local maxima and minima, intervals of concavity, inflection points, and all intercepts. Use these to sketch the graph of f(x).
- 6. (Fall 2003, Exam 3, #6) Find the minimum value of $f(x) = 3x + \frac{12}{x^2}$ for x > 0.