Practice Examination 2 - Math 141, Frank Thorne (thornef@mailbox.sc.edu)

Wednesday, October 12, 2011

Please work without books, notes, calculators, or any assistance from others. If you have any questions, feel free to ask me.

The exam will have only eight questions. This has nine.

(1) Do problem 8 on p. 162 of Stewart. (On an actual exam, any pictures will be photocopied or hand-drawn in.)

(2) If $f(x) = x + \sqrt{x}$, find $f'(x)$ using the definition of the derivative.

(3) Find $\frac{dy}{dx}$ if $y = \frac{x^2 - 2\sqrt{x}}{x}$.

(4) Find $\frac{dy}{dx}$ if $y = \csc x$. (You may take the derivatives of $\sin x$ and $\cos x$ for granted.)

(5) Find $\frac{dy}{dx}$ if $y = \sec^2 x + \tan^2 x$.

(6) If $e^{x/y} = x - y$, find $\frac{dy}{dx}$ by implicit differentiation.

(7) A water trough is 10 m long and a cross-section has the shape of an isosceles trapezoid that is 30 cm wide at the bottom, 80 cm wide at the top, and has height 50 cm. If the trough is being filled with water at the rate of 0.2 m/min^3, how fast is the water level rising when the water is 30 cm deep?

(8) Find $f'(x)$ if $f = \ln|\sec 5x + \tan 5x|$.

(9) Sketch the graph of a function that has two local maxima, one local minimum, and no absolute maximum.