Math 75B Quiz 7 (blue) $/20$ Name: _____
Fall 2008
Ch. 12 (Ebersole) and §2.8 (Stewart)

Please read directions carefully. Raise your hand if you are not sure what a problem is asking.
*You must explain your work thoroughly and unambiguously to receive full credit on questions or parts of questions designated as **Work and Answer**.*
No calculators or notes are allowed on this quiz.

Multiple Choice. (8 points) *Circle the letter of the best answer.*

1. The linear approximation of the function $g(x) = x^{11} - x + 2$ at $x = 1$ is

   (a) $y = -10x + 6$ (c) $y = 10x - 8$
   (b) $y = 12x + 10$ (d) $y = -12x + 6$

2. The linear approximation of the function $f(x) = \sqrt[4]{x}$ at $x = 2$ is $y = \frac{1}{32}x + \frac{3}{2}$. Using this (or differentials), $\sqrt[4]{15}$ is approximately

   (a) $\dfrac{61}{32}$ (c) $\dfrac{63}{32}$

   (b) $\dfrac{62}{32}$ (d) $\dfrac{65}{32}$

Fill-In. (4 points) If $f(x) = \ln x$, $x = 3$, and $dx = 0.1$, then $dy = $ _____
                                                                              (number)

Work and Answer. (8 points) *You must show all relevant work to receive full credit. You may use the back if you need more room.*

The volume of a cone with height 30 meters and radius r is

$$V(r) = 10\pi r^2.$$

A cone-shaped water tank of radius 5 meters and height 30 meters is to be painted with a sealant of uniform thickness that will increase the top radius by 0.2 cm ($= 0.002$ m). Use differentials to estimate the volume of sealant required. *Be sure to give units on your answer, e.g. yards, months, etc.*