

## MATH 1080, SPRING 2006, HW SET 4

You need to show all your work and explain with following the guideline described in the class webpage to get the full credit. And please staple your HW papers.

### HW 4 Due on Thursday 02/09/06

0. Memorize all definitions and go over examples given in class and read the textbook.

1. Use the rules (power, constant, sum, difference, product, quotient, and the chain rules) to find the derivative  $f'(x)$  of the following function  $f(x)$ . Simplify your answer as much as you can.

(1)  $f(x) = \ln(2x^2 + 1)$

(2)  $f(x) = \ln(\cos x)$

(3)  $f(x) = e^{\tan x}$

(4)  $f(x) = (\ln x)^2$

(5)  $f(x) = \ln(x^2)$

2. Evaluate  $\log_{10} 5 + \log_{10} 20 - 4 \ln(\sqrt{e}) + 15 \cdot 2^{\log_2(\frac{1}{5})} - e^{\ln 2} + \log_{18} 270 - \log_{18} 15$  as a single number.

3. A calculator shows that  $(2.01)^{10} = 1076.367$ . We want to approximate this without using a calculator. Approximate  $(2.01)^{10}$

(1) by the linear (1st order) approximation method

(2) by the quadratic (2nd order) approximation method

(3) Compare (1) and (2). Which is a better approximation considering  $(2.01)^{10} = 1076.367$ ?

4. An object is moving along a horizontal line according to the directed position  $s(t) = t^3 - 9t^2 + 24t$  in terms of time  $t$ .

(1) When is the object turning the moving direction (from the right to the left or from the left to the right)?

(2) When is the object moving to the right(forwards)?

(3) When is the object moving to the left(backwards)?

(4) When is the object moving to the right (forwards) faster and faster?