MAT 250 – SPRING 2010
Calculus 1

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Problem Set 3
March, 2010

Name : _____

1. Calculate the derivative of y with respect to x:

    (a) $y^4 - y = x^3 + x$

    (b) $x^2 y + 2xy^2 = x + y$

    (c) $\sin(xy) = y$

    (d) $\tan(x^2 y) = x + y$

    (e) $xe^y = 2xy + y^3$

2. Find an equation of the tangent line to the curve $x^2 y^3 + 2y = 3x$ at the point $(2, 1)$.

3. Compute the derivative of the function
$$y = \frac{x(x+1)^3}{(3x-1)^2}$$

4. Related Rates: See handout

5. Compute the derivative of the functions:

   (a) $y = \cos^{-1}(x^2)$

   (b) $y = \sqrt{1 - t^2} + \sin^{-1} t$

   (c) $y = e^{\cos^{-1} x}$

   (d) $y = x^4 \tan^{-1} x$

6. Compute the derivative of the functions:

   (a) $y = \dfrac{\ln x}{x}$

   (b) $y = (\ln x)^2$

   (c) $y = \ln(x^2)$

   (d) $y = \ln(\sin t + 1)$