

Math 191 - Sample Test 3 Nov 2014 –

name (printed)

student number

**I have read and understood
the instructions below:**

signature

Question 1 (Technique):

[] Differentiate

$$(1) f(t) = \frac{\ln(3-t)}{1 + \log_2 t}$$

$$(2) f(x) = \sqrt{e^{-ax}}$$

$$(3) f(x) = x \log_5(3x - 1)$$

$$(4) \quad f(x) = x^\pi + \pi^x.$$

- (5) Use logarithmic differentiation to find the derivative of $y = (\sqrt{x})^x$ and express it as a function of x only.

Question 2(High order derivatives):

[]

$$f(x) = \ln(x + \sqrt{1 + x^2}).$$

Compute $f''(0)$.

Question 3 (Newton Method):

□

Use Newton's method to approximate $\sqrt[4]{19}$ to two decimal places. Use 2 as the initial estimate.

Question 4 (Implicit):

□

Use implicit differentiation to find an equation of the tangent line to $y^2 + xy - x^2 = 5$ at the point $(4, 3)$.

Question 5 (Properties of log and expo functions):

(1) □ Solve

$$e^{1-x} = 3.$$

(2) [] Solve

$$\ln(1 - x) = -\ln(1 + x).$$

(3) [] Find the range of

$$f(x) = 3 - e^{-2x}.$$

Question 6(Inverses):

□ $f(x) = e^{3-\ln x}$. Find $f^{-1}(x)$.

Question 7():

□

Find the point elasticity of the demand equation $p = \frac{800}{2q + 1}$ for $q = 24$, and determine whether the demand is elastic, inelastic or has unit elasticity.