MATH 1007 E – Test 3

Wednesday, October 31st, 2012

NAME: _____

STUDENT NUMBER: _____

This test has 4 questions (worth a total of 20 marks). Calculators are not allowed. You have 50 minutes. Write your answers in the spaces provided and put a box around the final answers where appropriate.

1. (4 points) An object moving in a straight line has position function $s(t) = t^3 - \frac{9}{2}t^2 + 6t$.
(i) Are there any times when the object is at rest? If yes, when?
(ii) Are there any times when the object is moving with constant velocity? If yes, when?

2. (6 points) Find $\frac{dy}{dx}$ if

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

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

3. (7 points) Find the (first) derivatives of the following, simplifying where possible:

(a) $f(x) = (2x+2)^3 (x^2+5)^4$

(b) $y = \left(\dfrac{t^2}{\cos t}\right)^3$

4. (3 points) Use logarithmic differentiation to find the derivative of $f(x) = x^{x^2}$.