9 October, 2014
MATH 1004, Section C/D
Total marks:42

TEST 2

1. Differentiate the following: [2 marks for each]

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

   (b) $y = 3x^2 + 2x - 1$

   (c) $y = \sqrt{x}(3x^2 + 1)$

   (d) $y = \frac{x^3-1}{x^2+x+1}$

   (e) $y = \sqrt[3]{x^2 + x - 2}$

2. Consider $g(x) = \sqrt{2x + 1}$, such that $x \geq -\frac{1}{2}$. Find $g^{-1}(x)$ and state its domain [5 marks].

3. Differentiate the following: [3 marks each]

(a) $f(t) = \cos(\sin^{-1} 4t)$

(b) $g(t) = \ln(\sqrt{t^2 + 4})$

(c) $h(t) = 3^t \log_2(t^2 + 1)$

(d) $y(t) = e^{-2t} \tan^{-1} t$

(e) $x(t) = \cos(te^t)$

4. Given $y = x^x$, evaluate y' [5 marks].

5. Consider the surface $(x + y)^3 - x^3 - y^3 = 0$ [7 marks].

   (a) Solve for $\frac{dy}{dx}$.

   (b) Find the equation of the tangent line at $(1, -1)$.