


Basic Science Department Math. 1 Code: Math 101 Final Exam: 29 / 7 / 2013 Time Allowed: 2 hours	 Modern University <small>For Technology & Information</small>	Academic year: 2012 / 2013 Semester: Summer Examiners: Dr. Mona Samir Dr. Mohamed Eid
Answer All Questions	Faculty of Engineering	Total Mark: 40
Question 1		
<p>Find the first derivative of the following functions:</p> <p>(a) $y = \cos(e^x) + e^x \cos x$ (b) $y = \operatorname{sech}^{-1}x^2 + \log_3x^6$</p> <p>(c) $y = 8x^2 \cdot \sqrt[4]{4x^4 + 5}$ (d) $y = \cot^3(\ln x^7)$</p> <p>(e) $y = \frac{\sin(\sinh x^3)}{\sqrt{4-5x}}$ (f) $\tan^{-1}(x^3 + y^5) - \cosh 5x = 3y$</p> <p>(g) $y = x^3 + 3^x + 3x$ (h) $y = \sqrt{1+t^2}, \quad x = (1-2t)^{-2}$</p>		16
Question 2		
<p>Determine any maximum, minimum and inflection points of the function:</p> $f(x) = 3x^2 - x^3 + 1$		4
Question 3		
<p>Find the following integrals:</p> <p>(a) $\int (3^x + 3x^2 + 1) dx$ (b) $\int \left(\frac{1}{x} + 3 \cos 2x\right) dx$ (c) $\int \frac{x+3}{x^2-3x+2} dx$</p> <p>(d) $\int x \cdot \sin x dx$ (e) $\int \sin 3x \cdot \sin 2x dx$</p>		10
Question 4		
<p>(a) Compute the area of the region bounded by the curve $y = (x^2 - 2)^2$, x– axis, x in $[0, 1]$.</p>		3
<p>(b) Find the length of the curve $y = \frac{1}{2}(e^x + e^{-x})$ between $x = 0, x = 1$.</p>		3
<p>(c) If the region bounded by the curve $y = 1 + x^3$, x– axis, x in $[0, 1]$ is rotated about: (i) x– axis (ii) y – axis.</p> <p>Compute the volume V_x and the volume V_y of the generated solids.</p>		4

Good luck

Dr. Mona Samir

Dr. Mohamed Eid