

Ministry Of Higher Education Higher Institute of Engineering October 6 City Department of Basic Science	 مدينة الثقافة و العلوم	Prep. Year: Final Exam Mathematics: (Calculus I) Course Code: BAS 111 Date: 14 / 1 / 2013
الزمن: 3 ساعات	الامتحان (5) أسئلة في صفحة واحدة و المطلوب الإجابة عن كل الأسئلة	Marks
[1]Find y' from the following: (a) $y = 2x^3 + 3 \sin x$ (b) $y = 4^x \cdot \sec x$ (c) $y = \cosh x + \log(x + \cos x)$ (d) $y = \tan^{-1}x^2 + 3x$ (e) $y = \frac{\sinh^{-1}x}{\tanh x}$ (f) $y = 3^x + \sin^{-2}x$		12
[2](a)Write the membership table of the statement: $S = (A - C) \cup (A \cap B)$ (b)Evaluate the limits: (i) $\lim_{x \rightarrow 0} \frac{x - \tan x}{x - \sin x}$ (ii) $\lim_{x \rightarrow 0} \frac{\sin^3 x}{2^x - 1}$ (c) Determine the maximum, minimum and inflection points of: $f(x) = \frac{1}{3+x^2}$.		4 4 6
[3](a) Find y' where: $y = \tanh^{-1}t + 3t$, $x = \cos t^2 + 2 \ln t$. (b) Find y' from the equation: $y = x \sinh y + 3^x$. (c) Sketch the curve of the function $f(x) = x^3 - 9x$.		2 2 6
[4]Find the following integrals: (a) $\int (3x^2 + \cos x)dx$ (b) $\int (\frac{1}{1+x^2} + \frac{2x}{1+x^2})dx$ (c) $\int (1 - 2^x)^2 dx$ (d) $\int \frac{x}{x^2-4x-5} dx$ (e) $\int x \cdot \log x dx$ (f) $\int (\cos 4x \cdot \cos 3x) dx$		12
[5](a)Using trapezoidal rule, compute the integral $\int_1^2 \frac{x}{\ln(3+x)} dx$, $\Delta = 0.2$ (b)Find the area of the region between the curve $y = x^2 - 4$, x- axis, x in $[0, 3]$. (c)If the region between the curve $y = 1 + e^x$, x-axis, x in $[0, 1]$ is rotated about (i) x-axis (ii)y-axis. Find the volume of the generated solid in both cases.		3 3 6

Good Luck

Dr. Mohamed Eid