

The Islamic University of Gaza

Department of Mathematics

First Exam

Calculus B Math B 1401

Date: 20 – 3 – 2012

Name:	Q1	Q2	Q3	Q4	Total
ID No.:	10	10	10	10	40
Instructor:					

Solve the following questions:

1. a) Find $\lim_{x \rightarrow \infty} (1 + \sin \frac{2}{x})^x$.

b) Find y' for the function $y = (\sec x)^{\tan^{-1}(x)} + \operatorname{sech}^{-1}(e^x - 1)$.

2. Evaluate the following integrals:

a) $\int \sin^4 x \cos^3 x \, dx.$

b) $\int x(\sin^{-1} x)^2 \, dx.$

3. a) Prove that $\cosh^2 x - \sinh^2 x = 1$.

b) Solve for x : $\sqrt{1-x^2} \frac{d}{dx} (\sin^{-1} x)^2 = \log_2(2^{\frac{\pi}{3}})$

4. Choose the correct answer for each of the following:

i) If $f(x) = \ln(3x)$ and $g(x) = \ln(9x)$, then

(a) $\text{Dom}(f) \neq \text{Dom}(g)$

(b) $f'(x) \neq g'(x)$

(c) $g(x) = f(x) + \ln 3$

(d) $g(x) = f(x) + \ln 6$

ii) For $a > 1$, the function $\frac{\log_a x}{\log_x a}$ is equivalent to

(a) $\log_a x - \log_x a$

(b) $2 \log_a x$

(c) $(\log_a x)^2$

(d) $\log_{2a} x$

iii) If $x \geq 1$, then the exact value of $\csc^{-1} x + \cos^{-1} \frac{1}{x}$ is

(a) 0

(b) $\frac{\pi}{2}$

(c) π

(d) ∞

iv) The inverse of the function $f(x) = e^{\frac{1}{x}}$ is

(a) $\ln(\frac{1}{x})$

(b) $\ln x$

(c) $\frac{1}{\ln x}$

(d) $-\ln x$

v) $\lim_{x \rightarrow \infty} \sec^{-1} x$ is

(a) $\frac{\pi}{2}$

(b) 1

(c) 0

(d) ∞

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