The Islamic University Of Gaza
Department of Mathematics
Calculus A (MathA1401) summer semester
Date: 21/8/2007 Final Exam Time: 2 Hour

St. Name	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Total
St. no.	10	15	16	16	12	16	15	100
Instructor Dr.Mohammed M. Al-Ashker								

Answer all the following questions:

Q.1) Circle the corrected answer for each of the following:-

(1) If $\int_2^4 f(x)dx = \frac{1}{4}$ and $\int_2^4 g(x)dx = 5$. Then $\int_2^4 (5f(x) - \frac{1}{3}g(x))dx =$
(a)$\frac{15}{12}$ (b)$\frac{10}{12}$ (c)$\frac{-5}{12}$ (d)$\frac{20}{12}$.

(2) The graph of the function $y = \frac{10x+3}{2x-5}$ has a horizontal asymptote at:
(a)$y = 5$ (b)$y = \frac{3}{5}$ (c)$y = \frac{-3}{5}$ (d) $y = -5$.

(3) $\lim_{x\to 6} 7 =$
(a)1 (b)-1 (c)7 (d)dos'not exist.

(4) If $\lim_{x\to 3} \dfrac{x}{x-3} =$
(a) 0 (b) $-\infty$ (c) ∞ (d)dos'not exist.

(5) The equation of the tangent line to the curve $y = 2x$ at $x = 3$ is:
(a) $y = 2x$ (b) $y = 2x - 3$ (c) $y = 2x + 3$ (d)$y = 2$.

(6) $\frac{d^{71}(\sin x)}{dx^{71}} =$
$(a) - \cos x$ $(b)\ \sin x$ $(c)\ \cos x$ $(d) - \sin x$.

(7) The function $f(x) = \frac{1}{x}$ has an absolute maximum on the interval $[1, 3]$ of:
$(a)1$ $(b)\ 9$ $(c)\ \frac{1}{3}$ $(d)\frac{1}{9}$.

(8) Where is the function $y = \cos x$ increasing on the interval $[0, 2\pi]$?
$(a)[0, \pi]$ $(b)\ [\pi, 2\pi]$ $(c)\ [\frac{\pi}{2}, \frac{3\pi}{2}]$ $(d)\ [0, \frac{\pi}{2}] \cup [\frac{3\pi}{2}, 2\pi]$.

(9) The average value of the function $f(x) = \sqrt{4 - x^2}$ on the closed interval $[-2, 2]$ equals:
$(a)\ \pi$ $(b)\ \frac{\pi}{2}$ $(c)\ 2\pi$ $(d)\ \frac{\pi}{4}$.

(10) $\lim_{x\to 0} \dfrac{1 - \cos x}{\sin x} =$
(a) 0 (b) 1 (c) does not exist (d) ∞.

Q.2) (a) For the limit $\lim_{x \to -3} \sqrt{1 - 5x} = 4$. Find a $\delta > 0$ that works for $\varepsilon = 0.5$.

(b) Let $x^2 + 2xy + y^4 = 1$. Find $\frac{dy}{dx}$.

(c) Let $f(x) = \sqrt{2x + 1}$. Use the limit definition of derivative to find $f'(x)$.

Q.3) Let $f(x) = -x^3 - 3x^2 + 9x + 13$.

(a) Find critical points of $f(x)$.

(b) On what intervals is $f(x)$ increasing and decreasing?, determine local maximum and local minimum values of $f(x)$.

(c) On what intervals is the graph of $f(x)$ is concave up? concave down?. Find the points of inflection of $f(x)$.

(d) Sketch the graph of $f(x)$.

Q.4) Find the following limits.

(a) $\lim_{x\to\infty} \dfrac{\sqrt{x^2-1}}{2x+1}$.

(b) $\lim_{x\to 0} \dfrac{\tan 5x}{3x}$.

(c) $\lim_{x\to 1^+} \dfrac{x^2-1}{(x-1)^2}$.

(d) $\lim_{x\to\infty} x - \sqrt{x^2-2x+5}$.

Q.5) Find $f'(x)$ for the following functions.

(a) $f(x) = (x^4 + \sqrt{x} + 1)^{\frac{1}{4}}$.

(b) $f(x) = \sec 2x + \frac{\sin 2x + \cos x}{1+x^2}$.

(c) $f(x) = \int_{x^2}^{x^3} (1 + \sin t^2) dt$.

Q.6) Evaluate the following integrals:

(a) $\int x^2 + \frac{2}{x^{\frac{5}{2}}} dx.$

(b) $\int x\sqrt{x-1}dx.$

(c) $\int \frac{\sin\sqrt{x}}{\sqrt{x}} dx.$

(d) $\int_{-2}^{3} |x+1| dx.$

Q.7) (a) Find the area of the region bounded by the curves $x = y^2$ and $x - 2y = 3$.

(b) The region in the first quadrant bounded by $y = x^2 + 1$ and $y = 2$ is revolved about the line $y = 1$ to generate a solid, find the volume of the solid.