King Abdul Aziz University
Faculty of Sciences
Mathematics Department

Spring 2014 Final Exam
Calculus I- Math 110
Allowed Time: 120 M

لا يُسمح باستخدام الالة الحاسبة الإلكترونية ولا الجوال

C

Name:	ID:

تعليمات هامة:

تستطيع – بمشيئة الله – تحقيق أفضل نتيجة من خلال إتباع التعليمات الآتية:

- **يجب أن يكون نموذج الإجابة الذي أمامك هو C**
- **التأكد من أن عدد أسئلة الاختبار 40 سؤالاً.**
- **كتابة البيانات وتظليل الرقم الجامعي بطريقة صحيحة.**
- **احرص ما أمكن على التسلسل في الإجابة ، اجابة السؤال الأول ثم الثاني وهكذا.**
- **التأكد من اجابتك قبل تظليلها.**
- **ركز على رقم السؤال الذي ستظلل اجابته و الحرف الذي يحمل الإجابة الصحيحة ، وتظليل اجابة واحدة فقط ولن يسمح بالتظليل بعد انتهاء الوقت المحدد.**

Q.1	**The domain of the function** $f(x)=\csc^{-1}(2x-3)$ **is**						
(A)	$(-\infty,1)\cup(2,\infty)$	**(B)**	$(-\infty,1]\cup[2,\infty)$	**(C)**	$(1,2)$	**(D)**	$[1,2]$

Q.2	**If** $y=\sqrt{2e^{x^3}-3x^2}$ **, then** $y'=$		
(A)	$\dfrac{3x\,(xe^{x^3}-1)}{\sqrt{2e^{x^3}-3x^2}}$	**(B)**	$\dfrac{3x\,(xe^{x^3}-1)}{2\sqrt{2e^{x^3}-3x^2}}$
(C)	$\dfrac{3x\,(xe^{x^3}+1)}{\sqrt{2e^{x^3}+3x^2}}$	**(D)**	$\dfrac{3x\,(xe^{x^3}+1)}{2\sqrt{2e^{x^3}+3x^2}}$

Q.3	$\lim\limits_{x\to\infty}\left(\sqrt{x^2-7x+2}-x\right)=$						
(A)	$-\dfrac{7}{2}$	**(B)**	∞	**(C)**	0	**(D)**	$\dfrac{7}{2}$

Q.4	$330^\circ=$						
(A)	$\dfrac{7\pi}{6}$ rad	**(B)**	$\dfrac{11\pi}{6}$ rad	**(C)**	$\dfrac{5\pi}{3}$ rad	**(D)**	$\dfrac{4\pi}{3}$ rad

Q.5	$\lim\limits_{x\to2^+}\dfrac{x-5}{x-2}=$						
(A)	-3	**(B)**	3	**(C)**	∞	**(D)**	$-\infty$

Q.6	**If** $xy+y^4=2$**, then** $y'=$						
(A)	$\dfrac{y}{x-4y^3}$	**(B)**	$-\dfrac{y}{x-4y^3}$	**(C)**	$-\dfrac{y}{x+4y^3}$	**(D)**	$\dfrac{y}{x+4y^3}$

Q.7	$\lim\limits_{x\to3}\dfrac{x^3-27}{x-3}=$						
(A)	$\dfrac{1}{27}$	**(B)**	$\dfrac{0}{0}$	**(C)**	does not exist	**(D)**	27

Q.8	**If** $y=(2x^2+3)^7$**, then** $y'=$						
(A)	$28x\,(2x^2+3)^6$	**(B)**	$7(2x^2+3)^6$	**(C)**	$28x\,(2x^2+3)^7$	**(D)**	$32x\,(2x^2+3)^8$

Q.9	**The function** $f(x)=x^5-3x$						
(A)	Even	**(B)**	Odd	**(C)**	Even and odd	**(D)**	Niether even nor odd

Q.10	**If** $f(x)=\sqrt{x-3}$ **and** $g(x)=\sqrt{4-x}$ **, then** $D_{f+g}=$						
(A)	$\mathbf{R}$	**(B)**	$[3,\infty)$	**(C)**	$(-\infty,4]$	**(D)**	$[3,4]$

Q.11	**If** $y=\cot^4(2x^3)$**, then** $y'=$		
(A)	$24\cot^6(2x^3)$	**(B)**	$-4\cot^3(2x^3)\csc^2(2x^3)$
(C)	$-24x^2\cot^3(2x^3)\csc^2(2x^3)$	**(D)**	$24x^2\cot^3(2x^3)\csc^2(2x^3)$

Q.12	**The critical numbers of the function** $f(x)=\frac{1}{3}x^3+x^2-3x-1$ **are**						
(A)	-3 and 1	**(B)**	-3 and -1	**(C)**	1 and 3	**(D)**	-1 and 3

Q.13	**The function** $f(x)=\frac{1}{3}x^3+x^2-3x-1$ **is increasing on**						
(A)	$(-\infty,-1)\cup(3,\infty)$	**(B)**	$(-\infty,-3)\cup(1,\infty)$	**(C)**	$(-1,3)$	**(D)**	$(-3,1)$

Q.14	**The function** $f(x)=\frac{1}{3}x^3+x^2-3x-1$ **is decreasing on**						
(A)	$(-\infty,-1)\cup(3,\infty)$	**(B)**	$(-\infty,-3)\cup(1,\infty)$	**(C)**	$(-1,3)$	**(D)**	$(-3,1)$

Q.15	**The function** $f(x)=\frac{1}{3}x^3+x^2-3x-1$ **has a relative maximum point at**						
(A)	$\left(-1,\frac{8}{3}\right)$	**(B)**	$\left(1,-\frac{8}{3}\right)$	**(C)**	$(3,8)$	**(D)**	$(-3,8)$

Q.16	**The function** $f(x)=\frac{1}{3}x^3+x^2-3x-1$ **has a relative minimum point at**

(A)	$\left(-1,\frac{8}{3}\right)$	**(B)**	$\left(1,-\frac{8}{3}\right)$	**(C)**	$(3,8)$	**(D)**	$(-3,8)$

Q.17	**The graph of** $f(x)=\frac{1}{3}x^3+x^2-3x-1$ **is concave upward on**						
(A)	$(-1,\infty)$	**(B)**	$(1,\infty)$	**(C)**	$(-\infty,-1)$	**(D)**	$(-\infty,1)$

Q.18	**The graph of** $f(x)=\frac{1}{3}x^3+x^2-3x-1$ **is concave downward on**						
(A)	$(-\infty,1)$	**(B)**	$(-\infty,-1)$	**(C)**	$(-1,\infty)$	**(D)**	$(1,\infty)$

Q.19	**The function** $f(x)=\frac{1}{3}x^3+x^2-3x-1$ **has an inflection point at**						
(A)	$\left(-1,\frac{8}{3}\right)$	**(B)**	$\left(1,-\frac{8}{3}\right)$	**(C)**	$(3,8)$	**(D)**	$(-3,8)$
Q.20	$\lim_{x\to 3^-}\frac{5\lvert x-3\rvert}{x-3}=$						
(A)	1	**(B)**	-1	**(C)**	-5	**(D)**	5

Q.21	**If** $y=\log_3(2x^3+\sec x)+3^{x^2}$ **, then** $y'=$		
(A)	$\frac{6x^2+\sec x\tan x}{(2x^3+\sec x)}+2x\cdot 3^{x^2}\ln 3$	**(B)**	$\frac{6x^2-\sec x\tan x}{(2x^3+\sec x)\ln 3}+2x\cdot 3^{x^2}\ln 3$
(C)	$\frac{6x^2+\sec x\tan x}{(2x^3+\sec x)\ln 3}+2x\cdot 3^{x^2}$	**(D)**	$\frac{6x^2+\sec x\tan x}{(2x^3+\sec x)\ln 3}+2x\cdot 3^{x^2}\ln 3$

Q.22	**If** $x=\sin^{-1}\left(\frac{2}{7}\right)$, $\mathbf{0\le x\le \frac{\pi}{2}}$ **, then** $\cos x=$						
(A)	$\frac{3\sqrt{5}}{2}$	**(B)**	$\frac{2}{3\sqrt{5}}$	**(C)**	$\frac{3\sqrt{5}}{7}$	**(D)**	$\frac{7}{3\sqrt{5}}$

Q.23	$\lim_{x\to 0}(5x\cot(2x))=$						
(A)	$\frac{5}{2}$	**(B)**	10	**(C)**	does not exist	**(D)**	0

Q.24	Find the equation for the tangent to the curve $y = x - 4x^{-1}$ at the point $(1,-3)$.						
(A)	$y - 5x - 8 = 0$	(B)	$y - 4x + 7 = 0$	(C)	$y - 4x - 7 = 0$	(D)	$y - 5x + 8 = 0$

Q.25	If $y = \dfrac{x+6}{x+8}$, then $y' =$						
(A)	$-\dfrac{2}{(x+8)^2}$	(B)	$\dfrac{2}{(x+8)^2}$	(C)	$\dfrac{14}{(x+8)^2}$	(D)	$-\dfrac{14}{(x+8)^2}$

Q.26	If $y = \ln(x-2)$, then $y^{(n)} =$		
(A)	$(-1)^{n+1} \cdot (n-1)!(x-2)^{-(n+1)}$	(B)	$(-1)^n \cdot (n-1)!(x-2)^{-n}$
(C)	$(-1)^{n+1} \cdot (n-1)!(x-2)^{-n}$	(D)	$(-1)^{n+1} \cdot n!(x-2)^{-n}$

Q.27	If $x = t^2 - 5$, and $y = 5t - 4$ then find $\dfrac{dy}{dx}$ at $t = -2$. (Note: $\dfrac{dy}{dx} = \dfrac{\frac{dy}{dt}}{\frac{dx}{dt}}$)						
(A)	$-\dfrac{5}{2}$	(B)	$-\dfrac{2}{5}$	(C)	$-\dfrac{4}{5}$	(D)	$-\dfrac{5}{4}$

Q.28	If $f(x) = x - \dfrac{3}{x^2}$ and $g(x) = \sqrt{x+3}$, then $(f \circ g)(x) =$						
(A)	$\sqrt{x-3} + \dfrac{3}{x-3}$	(B)	$\sqrt{x + \dfrac{3}{x^2} + 3}$	(C)	$\sqrt{x+3} - \dfrac{3}{x+3}$	(D)	$\sqrt{x - \dfrac{3}{x^2} + 3}$

Q.29	If $y = \sin^{-1}(e^x) - \cot^{-1}(x^2)$, then $y' =$		
(A)	$\dfrac{e^x}{\sqrt{1-e^{x^2}}} + \dfrac{2x}{1+x^4}$	(B)	$\dfrac{e^x}{\sqrt{1-e^{2x}}} - \dfrac{1}{1+x^4}$
(C)	$\dfrac{e^x}{\sqrt{1-e^{2x}}} - \dfrac{2x}{1+x^4}$	(D)	$\dfrac{e^x}{\sqrt{1-e^{2x}}} + \dfrac{2x}{1+x^4}$

Q.30	If $y = \csc x \cdot \cot x$, then $y' =$		
(A)	$-\csc x\,(\cot^2 x + \csc x^2)$	(B)	$-\csc x\,(\cot^2 x + \csc^2 x)$

(C)	$-\csc x\,(\csc^2 x - \cot^2 x)$	**(D)**	$-\csc x\,(\cot^2 x - \csc^2 x)$

Q.31	**If** $y = (x+2)^5 (x-2)^4$, **then** $y' =$		
(A)	$(9x-2)(x+2)^4(x-2)^3$	**(B)**	$\dfrac{9x-2}{x^2-4}$
(C)	$(9x+2)(x+2)^4(x-2)^3$	**(D)**	$\dfrac{9x+2}{x^2-4}$

Q.32	$\sin(x+y) =$		
(A)	$\cos x \cos y + \sin x \sin y$	**(B)**	$\sin x \cos y - \cos x \sin y$
(C)	$\sin x \cos y + \cos x \sin y$	**(D)**	$\cos x \cos y - \sin x \sin y$

Q.33	**If** $y = x^{\cot x}$, **then** $y' =$		
(A)	$x^{\cot x}\left[\dfrac{\cot x}{x} - \csc^2 x \ln x\right]$	**(B)**	$x^{\cot x}\left[\dfrac{\cot x}{x} + \sec^2 x \ln x\right]$
(C)	$x^{\cot x}\left[\dfrac{\cot x}{x} + \csc^2 x \ln x\right]$	**(D)**	$\dfrac{\cot x}{x} - \csc^2 x \ln x$

Q.34	**The value in** $(0,5)$ **which makes** $f(x) = x^2 - x - 4$ **will satisfy the Mean Value Theorem on** $[0,5]$ **is**						
(A)	$\dfrac{1}{10}$	**(B)**	$\dfrac{3}{2}$	**(C)**	$\dfrac{1}{6}$	**(D)**	$\dfrac{5}{2}$

Q.35	**The function** $f(x) = \dfrac{x+7}{x^2 - 9x - 10}$ **is discontinuous at**		
(A)	$x = -10$ and $x = 1$	**(B)**	$x = -1$ and $x = 10$
(C)	$x = -2$ and $x = 5$	**(D)**	$x = -5$ and $x = 2$

Q.36	**The absolute maximum value of** $f(x) = x^3 - 3x + 11$ **in** $[-2,2]$ **is**						
(A)	8	**(B)**	14	**(C)**	9	**(D)**	13

Q.37	**The absolute minimum value of** $f(x) = x^3 - 3x + 11$ **in** $[-2,2]$ **is**						
(A)	8	**(B)**	14	**(C)**	9	**(D)**	13

Q.38	**If** $y = x^5 \cos x$ **, then** $y' =$		
(A)	$x^4(5\cos x - x\sin x)$	**(B)**	$-x^4(5\cos x - x\sin x)$
(C)	$x^4(5\cos x + x\sin x)$	**(D)**	$-x^4(5\cos x + x\sin x)$

Q.39	**If** $f(x) = \dfrac{2-3x}{7x-5}$ **, then** $f^{-1}(x) =$						
(A)	$\dfrac{5x+2}{7x+3}$	**(B)**	$\dfrac{5x+2}{7x-3}$	**(C)**	$\dfrac{5x-2}{7x-3}$	**(D)**	$\dfrac{5x-2}{7x+3}$

Q.40	**If** $f(x) = \sqrt{x}$ **, then** $\lim\limits_{h\to 0} \dfrac{f(5+h)-f(5)}{h} =$						
(A)	0	**(B)**	$\sqrt{5}$	**(C)**	$\dfrac{1}{\sqrt{5}}$	**(D)**	$\dfrac{1}{2\sqrt{5}}$