King Abdul Aziz University
Faculty of Sciences
Mathematics Department

Fall 2014 Final Exam
Calculus I- Math 110
Allowed Time: 2 hours

لا يُسمح باستخدام الالة الحاسبة الإلكترونية ولا التي بالجوال

B

Name:	ID:

تعليمات هامة:

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

- **يجب أن يكون نموذج الإجابة الذي أمامك هو B**
- **التأكد من أن عدد أسئلة الاختيار 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.**
- **تظليل جميع الإجابات في نموذج الاجابة بشكل واضح وكامل.**

Q.1	$\frac{7\pi}{6}$ rad $=$						
(A)	120^0	**(B)**	150^0	**(C)**	270^0	**(D)**	210^0

Q.2	**If** $y = \tan^{-1}\left(\frac{x-1}{2}\right)$, then $y' =$						
(A)	$\frac{2}{x^2+2x+5}$	**(B)**	$-\frac{2}{x^2+2x+5}$	**(C)**	$-\frac{2}{x^2-2x+5}$	**(D)**	$\frac{2}{x^2-2x+5}$

Q.3	$\lim_{x\to\infty}\left(\sqrt{4x^2+x}-2x\right) =$						
(A)	∞	**(B)**	$\frac{1}{4}$	**(C)**	0	**(D)**	$-\frac{1}{4}$

Q.4	**The horizontal asymptote of** $f(x)=\frac{1+x}{3x+1}$ **is**						
(A)	$y=-\frac{1}{3}$	**(B)**	$x=\frac{1}{3}$	**(C)**	$x=-\frac{1}{3}$	**(D)**	$y=\frac{1}{3}$

Q.5	**If** $y=(x-2)^{-1}$, then $y^{(n)} =$		Hint $(n!=n(n-1)\cdots 3\cdot 2\cdot 1)$
(A)	$-n!(x-2)^{-(n+1)}$	**(B)**	$(-1)^n n!(x-2)^{-(n+1)}$
(C)	$(-1)^n n(x-2)^{-(n+1)}$	**(D)**	$(-1)^n n!(x-1)^{-(n+1)}$

Q.6	**If** $y=9^{\tan x}+\ln(e^{-2x^3})$**, then** $y' =$		
(A)	$-9^{\tan x}\sec^2 x\ln 9+6x^2$	**(B)**	$9^{\tan x}\sec^2 x\ln 9-6x^2$
(C)	$9^{\tan x}\sec^2 x\ln 9+6x^2$	**(D)**	$-9^{\tan x}\sec^2 x-6x^2$

Q.7	$\lim_{x\to 1^+}\frac{\lvert x-1\rvert}{x^2-7x+6}$						
(A)	-1	**(B)**	1	**(C)**	$\frac{1}{5}$	**(D)**	$-\frac{1}{5}$

Q.8	**The domain of** $f\circ g$ **, where** $f(x)=x^2+3$ **and** $g(x)=\sqrt{x+2}$ **is**						
(A)	$(-2,\infty)$	**(B)**	$\mathbb{R}$	**(C)**	$(-\infty,-2]$	**(D)**	$[-2,\infty)$

Q.9	$\lim_{x\to 0}\frac{\cos(2x)-1}{3x^2}$						
(A)	$\frac{2}{3}$	**(B)**	$-\frac{2}{3}$	**(C)**	$\frac{1}{3}$	**(D)**	$-\frac{1}{3}$

Q.10	**If** $y=x^{x^4}$ **, then** $y'=$						
(A)	$x^{x^4+3}\left[1+4\ln x\right]$	**(B)**	$x^{x^4+3}\left[1+\ln x\right]$	**(C)**	$x^{x^4}\left[1+4\ln x\right]$	**(D)**	$x^3\left[1+4\ln x\right]$

Q.11	**The function** $f(x)=\log_2(3-x)$ **is continuous on**						
(A)	$(-\infty,-2)$	**(B)**	$(-\infty,2)$	**(C)**	$(-2,\infty)$	**(D)**	$(2,\infty)$

Q.12	**If** $y=\sin^6(\cos x^3)$**, then** $y'=$		
(A)	$y=-18x^2\sin^5(\cos x^3)\cos(\cos x^3)\sin(x^3)$	**(B)**	$y=-18x^2\sin^5(\cos x^3)$
(C)	$y=18x^2\sin^5(\cos x^3)\cdot\sin(x^3)$	**(D)**	$y=-6\sin^5(\cos x^3)\cdot\sin(x^3)$

Q.13	**If** $x=\sin^{-1}\left(\frac{5}{6}\right),\ 0\le x\le\frac{\pi}{2}$, **then** $\cos x=$						
(A)	$\frac{6}{\sqrt{11}}$	**(B)**	$\frac{5}{\sqrt{11}}$	**(C)**	$\frac{\sqrt{11}}{6}$	**(D)**	$\frac{\sqrt{11}}{5}$

Q.14	**If** $f(x)=5x^2$ **, then** $\frac{f(x+h)-f(x)}{h}=$						
(A)	$10x$	**(B)**	$5x+h$	**(C)**	$10x+5h$	**(D)**	$10x+h^2$

Q.15	**If** $f(x)=-3+\log_2 x$ **, then** $f^{-1}(x)=$						
(A)	3^{x+2}	**(B)**	3^{x-2}	**(C)**	2^{x-3}	**(D)**	2^{x+3}

Q.16	**The equation of the line which passes through the point** $(3,1)$ **and parallel to the line** $4y+2x+3=0$ **is**						
(A)	$2y+x-7=0$	**(B)**	$2y+x-5=0$	**(C)**	$2y+x-6=0$	**(D)**	$2y+x-9=0$

Q.17	**The range of the function** $f(x)=-5-3^x$						
(A)	$(5,\infty)$	**(B)**	$(-\infty,-5)$	**(C)**	$(-\infty,5)$	**(D)**	$(-5,\infty)$

Q.18	If $y = 6\cos t$, and $x = 2\sin t$, then find $\frac{dy}{dx}$ at $t = \frac{\pi}{6}$. Hint $\left(\frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}} \right)$						
(A)	$-\frac{3}{\sqrt{3}}$	(B)	$3\sqrt{3}$	(C)	$-3\sqrt{3}$	(D)	$\frac{3}{\sqrt{3}}$

Q.19	The tangent line equation to the curve $f(x) = \frac{x+3}{x-2}$ at the point $(1,-4)$ is						
(A)	$y + 5x - 1 = 0$	(B)	$y + 5x - 6 = 0$	(C)	$y - x + 5 = 0$	(D)	$y - 5x - 1 = 0$

Q.20	If $y^2 + xy = 1 + \sec x$, then $y' =$						
(A)	$\frac{\sec x \tan x - y}{2y + x}$	(B)	$\frac{y + \sec x \tan x}{2y - x}$	(C)	$\frac{y + \sec x \tan x}{x + 2y}$	(D)	$\frac{\sec x \tan x - y}{x - 2y}$

Q.21	If $y = -\frac{1}{3x^3} + 2\sqrt{x} - 5$, then $y' =$						
(A)	$\frac{1}{x^4} + \frac{1}{2\sqrt{x}}$	(B)	$-\frac{1}{x^2} + \frac{1}{\sqrt{x}}$	(C)	$-\frac{1}{x^4} + \frac{1}{\sqrt{x}}$	(D)	$\frac{1}{x^4} + \frac{1}{\sqrt{x}}$

Q.22	The absolute minimum value of $f(x) = 12x - 3x^2 - 1$ in $[0,3]$ is						
(A)	-1	(B)	1	(C)	-2	(D)	2

Q.23	The absolute maximum value of $f(x) = 12x - 3x^2 - 1$ in $[0,3]$ is						
(A)	10	(B)	14	(C)	11	(D)	13

Q.24	If $y = \log_5(x^3 - e^x)$, then $y' =$						
(A)	$\frac{3x^2 - e^x}{x^3 - e^x}$	(B)	$\frac{1}{(x^3 - e^x)\ln 5}$	(C)	$\frac{3x^2 - e^x}{(x^3 - e^x)\ln 5}$	(D)	$\frac{3x^2 + e^x}{(x^3 - e^x)\ln 5}$

Q.25	$\lim_{x \to 6} \frac{36 - x^2}{x - 6} =$						
(A)	-12	(B)	12	(C)	0	(D)	Does not exist

Q.26	The critical numbers of the function $f(x) = 2x^3 - 3x^2 + 1$ are						
(A)	$0,2$	(B)	$-2,0$	(C)	$-1,0$	(D)	$0,1$

Q.27	The function $f(x)=2x^3-3x^2+1$ is increasing on						
(A)	$(-\infty,-2)\cup(0,\infty)$	(B)	$(-\infty,0)\cup(2,\infty)$	(C)	$(-\infty,-1)\cup(0,\infty)$	(D)	$(-\infty,0)\cup(1,\infty)$

Q.28	The function $f(x)=2x^3-3x^2+1$ is decreasing on						
(A)	$(-2,0)$	(B)	$(0,2)$	(C)	$(-1,0)$	(D)	$(0,1)$

Q.29	The function $f(x)=2x^3-3x^2+1$ has a relative maximum point at						
(A)	$(-2,-27)$	(B)	$(0,1)$	(C)	$(1,0)$	(D)	$(2,5)$

Q.30	The function $f(x)=2x^3-3x^2+1$ has a relative minimum point at						
(A)	$(-2,-27)$	(B)	$(0,1)$	(C)	$(1,0)$	(D)	$(2,5)$

Q.31	The graph of $f(x)=2x^3-3x^2+1$ is concave upward on						
(A)	$(-2,\infty)$	(B)	$(2,\infty)$	(C)	$(-\frac{1}{2},\infty)$	(D)	$(\frac{1}{2},\infty)$

Q.32	The graph of $f(x)=2x^3-3x^2+1$ is concave downward on						
(A)	$(-\infty,\frac{1}{2})$	(B)	$(-\infty,-\frac{1}{2})$	(C)	$(-\infty,-2)$	(D)	$(-\infty,2)$

Q.33	The function $f(x)=2x^3-3x^2+1$ has an inflection point at						
(A)	$(2,5)$	(B)	$(-2,-27)$	(C)	$(\frac{1}{2},\frac{1}{2})$	(D)	$(-\frac{1}{2},0)$

Q.34	If $y=\sqrt{(2\sin x-x^2)^3}$, then $y'=$		
(A)	$3(-x-\cos x)\sqrt{2\sin x-x^2}$	(B)	$3(x+\cos x)\sqrt{-x^2-2\sin x}$
(C)	$3(x+\cos x)\sqrt{2\sin x-x^2}$	(D)	$3(\cos x-x)\sqrt{2\sin x-x^2}$

Q.35	If $y=\cos^{-1}\left(e^{x^4}\right)$, then $y'=$						
(A)	$\frac{4x^3e^{x^4}}{\sqrt{1-e^{x^8}}}$	(B)	$-\frac{4x^3e^{x^4}}{\sqrt{1-e^{x^8}}}$	(C)	$-\frac{4x^3e^{x^4}}{\sqrt{1-e^{2x^4}}}$	(D)	$\frac{4x^3e^{x^4}}{\sqrt{1-e^{2x^4}}}$

Q.36	If $y=\left(2x^3+\sec x\right)^6$, then $y'=$		
(A)	$6\left(2x^3+\sec x\right)^5\left(6x^2+\sec x\tan x\right)$	(B)	$6\left(2x^3+\sec x\right)^7\left(6x^2-\sec x\tan x\right)$
(C)	$6\left(2x^3+\sec x\right)^5$	(D)	$(2x^3+\sec x)^5(6x^2+\sec x\tan x)$

Q.37	$(\sin x - \cos x)^2 =$						
(A)	$1-\sin 2x$	(B)	$1-\cos 2x$	(C)	$1+\cos 2x$	(D)	$1+\sin 2x$

Q.38	If $y = \ln\frac{x-4}{x+5}$, then $y' =$						
(A)	$\frac{9}{(x+5)(x-4)}$	(B)	$-\frac{9}{(x+5)(x-4)}$	(C)	$-\frac{1}{(x+5)(x-4)}$	(D)	$\frac{1}{(x+5)(x-4)}$

Q.39	The values in $(0,2)$ which makes $f(x) = x^3 - 3x^2 + 2x + 5$ satisfied Rolle's Theorem on $[0,2]$ are						
(A)	$-1\pm\frac{\sqrt{3}}{3}$	(B)	$1\pm\frac{\sqrt{3}}{3}$	(C)	$1\pm\frac{4\sqrt{3}}{6}$	(D)	$1\pm\frac{\sqrt{3}}{6}$

Q.40	If $f(x) = \csc x \cot x$, then $y' =$		
(A)	$-\csc x(1+2\csc^2 x)$	(B)	$-\csc x(-1-2\csc^2 x)$
(C)	$-\csc x(-1+2\csc^2 x)$	(D)	$\csc x(-1+2\csc^2 x)$