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

A

Name:	ID:

تعليمات هامة:

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

- **يجب أن يكون نموذج الإجابة الذي أمامك هو A**
- **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	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.2	The tangent line equation to the curve $f(x) = \frac{x+2}{x-3}$ at the point $(2,-4)$ is						
(A)	$y + 2x + 8 = 0$	(B)	$y + 5x - 6 = 0$	(C)	$y + 5x + 6 = 0$	(D)	$y + 5x - 1 = 0$

Q.3	If $f(x) = \csc x \cot x$, then $y' =$		
(A)	$-\csc x(-1+2\cot^2 x)$	(B)	$-\csc x(1-2\cot^2 x)$
(C)	$\csc x(1+2\cot^2 x)$	(D)	$-\csc x(1+2\cot^2 x)$

Q.4	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.5	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.6	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.7	The function $f(x) = 2x^3 + 3x^2 - 1$ has a relative maximum point at						
(A)	$(-2,-5)$	(B)	$(0,-1)$	(C)	$(-1,0)$	(D)	$(1,4)$

Q.8	The function $f(x) = 2x^3 + 3x^2 - 1$ has a relative minimum point at						
(A)	$(-2,-5)$	(B)	$(0,-1)$	(C)	$(-1,0)$	(D)	$(1,4)$

Q.9	The graph of $f(x) = 2x^3 + 3x^2 - 1$ is concave upward on						
(A)	$(-\infty,\frac{1}{2})$	(B)	$(-\infty,-\frac{1}{2})$	(C)	$(-\frac{1}{2},\infty)$	(D)	$(\frac{1}{2},\infty)$

Q.10	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)	$(-\frac{1}{2},\infty)$	(D)	$(\frac{1}{2},\infty)$

Q.11	The function $f(x)=2x^3+3x^2-1$ has an inflection point at						
(A)	$\left(\frac{1}{2},0\right)$	(B)	$\left(-\frac{1}{2},-\frac{1}{2}\right)$	(C)	$\left(\frac{1}{2},-\frac{1}{2}\right)$	(D)	$\left(-\frac{1}{2},0\right)$

Q.12	If $xy-y^2=1+\sec x$, 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.13	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.14	The range of the function $f(x)=5-3^x$ is						
(A)	$(5,\infty)$	(B)	$(-\infty,-5)$	(C)	$(-\infty,5)$	(D)	$(-5,\infty)$

Q.15	If $x=\sin^{-1}\left(\frac{5}{6}\right),\ 0\le x\le\frac{\pi}{2}$, then $\cot x=$						
(A)	$\frac{6}{\sqrt{11}}$	(B)	$\frac{5}{\sqrt{11}}$	(C)	$\frac{\sqrt{11}}{6}$	(D)	$\frac{\sqrt{11}}{5}$

Q.16	The vertical asymptote of $f(x)=\frac{1-x}{2x+1}$ is						
(A)	$y=-\frac{1}{2}$	(B)	$x=\frac{1}{2}$	(C)	$x=-\frac{1}{2}$	(D)	$y=\frac{1}{2}$

Q.17	$(\sin x-\cos x)^2=$						
(A)	$1-\cos 2x$	(B)	$1-\sin 2x$	(C)	$1+\cos 2x$	(D)	$1+\sin 2x$

Q.18	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.19	If $y=\cot^{-1}\left(\frac{x+1}{2}\right)$, 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.20	If $y=\left(2x^3+\sec x\right)^5$, then $y'=$		
(A)	$5\left(2x^3+\sec x\right)^4$	(B)	$5\left(2x^3+\sec x\right)^4\left(6x^2-\sec x\tan x\right)$
(C)	$5\left(2x^3+\sec x\right)^4\left(6x^2+\sec x\tan x\right)$	(D)	$5\left(2x^3+\sec x\right)^6\left(6x^2+\sec x\tan x\right)$

Q.21	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)	$[2,\infty)$	(D)	$(-\infty,2]$

Q.22	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.23	$\lim_{x\to 1^-}\frac{\lvert x-1\rvert}{x^2-4x+3}$						
(A)	-1	(B)	1	(C)	$\frac{1}{2}$	(D)	$-\frac{1}{2}$

Q.24	If $y=\sin^5(\cos x^3)$, then $y'=$		
(A)	$y=15x^2\sin^4(\cos x^3)\cdot\sin(x^3)$	(B)	$y=-15x^2\sin^4(\cos x^3)$
(C)	$y=-15x^2\sin^4(\cos x^3)\cos(\cos x^3)\sin(x^3)$	(D)	$y=-5\sin^4(\cos x^3)\cdot\sin(x^3)$

Q.25	The equation of the line which passes through the point $(1,3)$ 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.26	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.27	$\lim_{x\to 7}\frac{49-x^2}{x-7}=$						
(A)	0	(B)	14	(C)	−14	(D)	Does not exist

Q.28	$\lim_{x\to 0}\frac{\cos(2x)-1}{9x^2}=$						
(A)	$\frac{2}{9}$	(B)	$-\frac{2}{9}$	(C)	$\frac{1}{9}$	(D)	$-\frac{1}{9}$

Q.29	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.30	The function $f(x)=\log_3(2-x)$ is continuous on						
(A)	$(-\infty,-2)$	(B)	$(-\infty,2)$	(C)	$(-2,\infty)$	(D)	$(2,\infty)$

Q.31	If $f(x)=6x^2$, then $\frac{f(x+h)-f(x)}{h}=$						
(A)	$12x$	(B)	$6x+h$	(C)	$12x+h^2$	(D)	$12x+6h$

Q.32	If $y=x^{x^5}$, then $y'=$						
(A)	$x^{x^5+4}[1+\ln x]$	(B)	$x^{x^5+4}[1+5\ln x]$	(C)	$x^{x^5}[1+4\ln x]$	(D)	$x^5[1+5\ln x]$

Q.33	If $y=\sqrt{(-x^2-2\sin x)^3}$, then $y'=$		
(A)	$-3(x+\cos x)\sqrt{-x^2-2\sin x}$	(B)	$3(x+\cos x)\sqrt{-x^2-2\sin x}$
(C)	$-3(-x+\cos x)\sqrt{-x^2-2\sin x}$	(D)	$-3(x-\cos x)\sqrt{-x^2-2\sin x}$

Q.34	**If** $y=(x-1)^{-1}$, **then** $y^{(n)}=$			Hint $(n!=n(n-1)\cdots 3\cdot 2\cdot 1)$
(A)	$-n!(x-1)^{-(n+1)}$	**(B)**	$(-1)^n n!(x-1)^{-n+1}$	
(C)	$(-1)^n n(x-1)^{-(n+1)}$	**(D)**	$(-1)^n n!(x-1)^{-(n+1)}$	

Q.35	$\lim_{x\to\infty}\left(\sqrt{9x^2+x}-3x\right)=$						
(A)	∞	**(B)**	$-\frac{1}{6}$	**(C)**	0	**(D)**	$\frac{1}{6}$

Q.36	**If** $y=\sin^{-1}\left(e^{x^3}\right)$, **then** $y'=$						
(A)	$\frac{3x^2e^{x^3}}{\sqrt{1-e^{x^6}}}$	**(B)**	$-\frac{3x^2e^{x^3}}{\sqrt{1-e^{x^6}}}$	**(C)**	$-\frac{3x^2e^{x^3}}{\sqrt{1-e^{2x^3}}}$	**(D)**	$\frac{3x^2e^{x^3}}{\sqrt{1-e^{2x^3}}}$

Q.37	**The absolute maximum value of** $f(x)=12x-3x^2-1$ **in** $[0,3]$ **is**						
(A)	10	**(B)**	14	**(C)**	11	**(D)**	13

Q.38	**The absolute minimum value of** $f(x)=12x-3x^2-1$ **in** $[0,3]$ **is**						
(A)	-1	**(B)**	1	**(C)**	-2	**(D)**	2

Q.39	$\frac{5\pi}{6}$ rad $=$						
(A)	120^0	**(B)**	150^0	**(C)**	270^0	**(D)**	210^0

Q.40	**If** $f(x)=-2+\log_3 x$, **then** $f^{-1}(x)=$						
(A)	3^{x+2}	**(B)**	3^{x-2}	**(C)**	2^{x-3}	**(D)**	2^{x+3}