



King Abdul Aziz University
Faculty of Sciences
Mathematics Department

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

لا يُسمح باستخدام الآلة الحاسبة الإلكترونية ولا التي بالجوال

D

Name:

ID:

تعليمات هامة:

- تستطيع – بمشيئة الله – تحقيق أفضل نتيجة من خلال إتباع التعليمات الآتية:
- يجب أن يكون نموذج الإجابة الذي أمامك هو D
- 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 $f(x) = 3 + \log_2 x$, then $f^{-1}(x) =$					
(A)	3^{x+2}	(B)	3^{x-2}	(C)	2^{x-3}	(D) 2^{x+3}

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

Q.3	If $x = \sin^{-1}\left(\frac{5}{6}\right)$, $0 \leq x \leq \frac{\pi}{2}$, then $\sec x =$					
(A)	$\frac{6}{\sqrt{11}}$	(B)	$\frac{5}{\sqrt{11}}$	(C)	$\frac{\sqrt{11}}{6}$	(D) $\frac{\sqrt{11}}{5}$

Q.4	The absolute minimum value of $f(x) = 12x - 3x^2 + 2$ in $[0, 3]$ is					
(A)	-1	(B)	1	(C)	-2	(D) 2

Q.5	The absolute maximum value of $f(x) = 12x - 3x^2 + 2$ in $[0, 3]$ is					
(A)	10	(B)	14	(C)	11	(D) 13

Q.6	$\lim_{x \rightarrow 0} \frac{\cos(2x) - 1}{5x^2} =$					
(A)	$-\frac{2}{5}$	(B)	$\frac{1}{5}$	(C)	$-\frac{1}{5}$	(D) $\frac{2}{5}$

Q.7	If $y = x^{x^3}$, then $y' =$					
(A)	$x^{x^3} [1 + 3 \ln x]$	(B)	$x^{x^3+2} [1 + \ln x]$	(C)	$x^{x^3+2} [1 + 3 \ln x]$	(D) $x^2 [1 + 3 \ln x]$

Q.8	$\lim_{x \rightarrow 1^+} \frac{ x-1 }{x^2 - 6x + 5} =$					
(A)	$\frac{1}{4}$	(B)	$-\frac{1}{4}$	(C)	-1	(D) 1

Q.9	$(\sin x + \cos x)^2 =$					
(A)	$1 - \sin 2x$	(B)	$1 - \cos 2x$	(C)	$1 + \sin 2x$	(D) $1 + \cos 2x$

Q.10	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.11	If $y = -5^{\tan x} + \ln(e^{-2x^3})$, then $y' =$					
(A)	$5^{\tan x} \sec^2 x \ln 5 + 6x^2$	(B)	$5^{\tan x} \sec^2 x \ln 5 - 6x^2$			
(C)	$-5^{\tan x} \sec^2 x - 6x^2$	(D)	$-5^{\tan x} \sec^2 x - 6x^2$			

Q.12	If $y = (x-5)^{-1}$, then $y^{(n)} =$ Hint($n! = n(n-1) \cdots 3 \cdot 2 \cdot 1$)					
(A)	$(-1)^n n(x-5)^{-(n+1)}$	(B)	$-n!(x-5)^{-(n+1)}$			
(C)	$(-1)^n n!(x-5)^{-(n+1)}$	(D)	$(-1)^n n!(x-5)^{-n+1}$			

Q.13	The function $f(x) = \log_7(5-x)$ is continuous on						
(A)	$(-\infty, -5)$	(B)	$(5, \infty)$	(C)	$(-\infty, 5)$	(D)	$(-5, \infty)$

Q.14	The equation of the line which passes through the point $(1,4)$ 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.15	$\lim_{x \rightarrow 6} \frac{9 - x^2}{x - 3} =$						
(A)	Does not exist	(B)	-6	(C)	0	(D)	6

Q.16	If $f(x) = 3x^2$, then $\frac{f(x+h) - f(x)}{h} =$						
(A)	$3x + h$	(B)	$6x + 3h$	(C)	$6x$	(D)	$6x + h^2$

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

Q.18	If $y = -\frac{1}{3x^3} - 2\sqrt{x} - 5$, then $y' =$						
(A)	$\frac{1}{x^2} - \frac{1}{\sqrt{x}}$	(B)	$\frac{1}{x^4} - \frac{1}{\sqrt{x}}$	(C)	$\frac{1}{x^4} - \frac{1}{2\sqrt{x}}$	(D)	$-\frac{1}{x^4} - \frac{1}{\sqrt{x}}$

Q.19	If $y = \sin^8(\cos x^3)$, then $y' =$			
(A)	$y = -24x^2 \sin^7(\cos x^3)$	(B)	$y = 24x^2 \sin^7(\cos x^3) \cdot \sin(x^3)$	
(C)	$y = -8\sin^7(\cos x^3) \cdot \sin(x^3)$	(D)	$y = -24x^2 \sin^7(\cos x^3) \cos(\cos x^3) \sin(x^3)$	

Q.20	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)	$\csc x (-1 + 2 \csc^2 x)$	

Q.21	The critical numbers of the function $f(x) = x^3 - 3x^2 + 1$ are			
(A)	0,2	(B)	-2,0	(C) -1,0 (D) 0,1

Q.22	The function $f(x) = x^3 - 3x^2 + 1$ 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.23	The function $f(x) = x^3 - 3x^2 + 1$ is decreasing on			
(A)	$(-2, 0)$	(B)	$(0, 2)$	(C) $(-1, 0)$ (D) $(0, 1)$

Q.24	The function $f(x) = x^3 - 3x^2 + 1$ has a relative maximum point at			
(A)	$(-2, -19)$	(B)	$(0, 1)$	(C) $(1, -1)$ (D) $(2, -3)$

Q.25	The function $f(x) = x^3 - 3x^2 + 1$ has a relative minimum point at			
(A)	$(-2, -19)$	(B)	$(0, 1)$	(C) $(1, -1)$ (D) $(2, -3)$

Q.26	The graph of $f(x) = x^3 - 3x^2 + 1$ is concave upward on			
(A)	$(-1, \infty)$	(B)	$(1, \infty)$	(C) $(-\frac{1}{2}, \infty)$ (D) $(\frac{1}{2}, \infty)$

Q.27	The graph of $f(x) = x^3 - 3x^2 + 1$ is concave downward on			
(A)	$(-\infty, \frac{1}{2})$	(B)	$(-\infty, -\frac{1}{2})$	(C) $(-\infty, -1)$ (D) $(-\infty, 1)$

Q.28	The function $f(x) = x^3 - 3x^2 + 1$ has an inflection point at			
(A)	$(\frac{1}{2}, \frac{3}{8})$	(B)	$(-\frac{1}{2}, \frac{1}{8})$	(C) $(1, -1)$ (D) $(-1, 3)$

Q.29	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.30	If $y = -6\cos t$, and $x = 2\sin t$, then find $\frac{dy}{dx}$ at $t = \frac{\pi}{3}$. 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.31	The tangent line equation to the curve $f(x) = \frac{x+3}{x-4}$ at the point $(3, -6)$ is						
(A)	$y - 7x - 15 = 0$	(B)	$y + 7x + 15 = 0$	(C)	$y + 7x - 15 = 0$	(D)	$y - 3x + 9 = 0$

Q.32	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)	$1\pm\frac{4\sqrt{3}}{6}$	(C)	$1\pm\frac{\sqrt{3}}{6}$	(D)	$1\pm\frac{\sqrt{3}}{3}$

Q.33	$\frac{3\pi}{2}$ rad =						
(A)	120^0	(B)	150^0	(C)	270^0	(D)	210^0

Q.34	If $y = \sin^{-1}\left(e^{x^4}\right)$, then $y' =$						
(A)	$\frac{4x^3 e^{x^4}}{\sqrt{1-e^{x^8}}}$	(B)	$\frac{4x^3 e^{x^4}}{\sqrt{1-e^{2x^4}}}$	(C)	$-\frac{4x^3 e^{x^4}}{\sqrt{1-e^{2x^4}}}$	(D)	$-\frac{4x^3 e^{x^4}}{\sqrt{1-e^{x^8}}}$

Q.35	The domain of $f \circ g$, where $f(x) = x^2 + 3$ and $g(x) = \sqrt{x - 3}$ is						
(A)	$[3, \infty)$	(B)	$(3, \infty)$	(C)	$(-\infty, 3]$	(D)	$\mathbb{R}$

Q.36	$\lim_{x \rightarrow \infty} \left(\sqrt{25x^2 + x} - 5x \right) =$						
(A)	0	(B)	∞	(C)	$\frac{1}{10}$	(D)	$-\frac{1}{10}$

Q.37	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.38	If $\sec x + y^2 = xy + 1$, 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.39	If $y = \log_7(x^3 + e^x)$, then $y' =$					
(A)	$\frac{3x^2 + e^x}{(x^3 + e^x) \ln 7}$	(B)	$\frac{3x^2 - e^x}{(x^3 + e^x) \ln 7}$	(C)	$\frac{3x^2 + e^x}{x^3 + e^x}$	(D) $\frac{1}{(x^3 + e^x) \ln 7}$

Q.40	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)	$3(x - \cos x) \sqrt{x^2 + 2 \sin x}$	