King Abdulaziz University
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Department of Mathematics

Final Exam – Math110
Date: 13/4/1439
Time: 120 minutes

Name………………………………………… ID:…………............................ **A**

Choose the correct answer of the following questions:

(1)	The critical numbers of the function $f(x) = x^3 - 6x^2 + 9x + 2$ are:			
	(A) -4,0 ,4	(B) -1 ,-3	(C) 1,3	(D) - 2,0,2

(2)	The function $f(x) = x^3 - 6x^2 + 9x + 2$ is increasing on:			
	(A) $(-\infty,1)\cup(3,\infty)$	(B) $(1,3)$	(C) $(3,\infty)$	(D) $(1,2)\cup(2,\infty)$

(3)	The function $f(x) = x^3 - 6x^2 + 9x + 2$ is decreasing on:			
	(A) $(-\infty,1)\cup(3,\infty)$	(B) $(1,3)$	(C) $(3,\infty)$	(D) $(1,2)\cup(2,\infty)$

(4)	The function $f(x) = x^3 - 6x^2 + 9x + 2$ has a local maximum value at			
	(A) $x = 3$	(B) $x = -1$	(C) $x = -3$	(D) $x = 1$

(5)	The function $f(x) = x^3 - 6x^2 + 9x + 2$ has a local minimum value at			
	(A) $x = -1$	(B) $x = 2$	(C) $x = 3$	(D) $x = -2$

(6)	The graph of the function $f(x) = x^3 - 6x^2 + 9x + 2$ is concave upward on:			
	(A) $(2,\infty)$	(B) $(-2,\infty)$	(C) $(-\infty,2)$	(D) $(0,\infty)$

(7)	The graph of the function $f(x) = x^3 - 6x^2 + 9x + 2$ is concave downward on:			
	(A) $(2,\infty)$	(B) $(-2,\infty)$	(C) $(-\infty,2)$	(D) $(0,\infty)$

(8)	The graph of the function $f(x) = x^3 - 6x^2 + 9x + 2$ has an inflection point at:			
	(A) $(2,24)$	(B) $(4,2)$	(C) $(0,0)$	(D) $(2,4)$

(9)	The vertical asymptote of the graph of the function $y = \dfrac{3x}{x-3}$ is			
	(A) $x = -1$	(B) $x = 3$	(C) $y = 3$	(D) $y = -1$

(10)	The horizontal asymptote of the graph of the function $y = \dfrac{3x}{x-3}$ is			
	(A) $x = -1$	(B) $x = 3$	(C) $y = 3$	(D) $y = -1$

(11)	If $y = e^x \csc x$, then $y' =$			
	(A) $e^x \sec x(\tan x + 1)$	(B) $e^x \csc x(1 + \cot x)$	(C) $e^x \csc x$	(D) $e^x \csc x(1 - \cot x)$

(12)	If $y=\sin(\tan x)$, then $y'=$			
	(A) $\sec^2 x\cos(\tan x)$	(B) $\cos(\tan x)$	(C) $\sec^2 x\cos x$	(D) $\cos x$

(13)	If $y=x^x$, then $y'=$			
	(A) $x^x\ln x$	(B) x^x	(C) $x^x(1-\ln x)$	(D) $x^x(1+\ln x)$

(14)	If $4\cos x\sin y=1$, then $y'=$			
	(A) $y'=\tan x\tan y$	(B) $y'=\dfrac{\sin x}{\cos y}$	(C) $y'=\tan y$	(D) $y'=0$

(15)	If $y=\ln(\sin 2x)$, then $y'=$			
	(A) $\cot 2x$	(B) $-2\cot x$	(C) $2\cot 2x$	(D) $2\tan 2x$

(16)	If $f(x)=(2)^{\cos x}$, then $f'(x)=$			
	(A) $-\sin x\ln 2$	(B) $-(2)^{\cos x}\ln 2$	(C) $(2)^{\sin x}\sin x\ln 2$	(D) $-(2)^{\cos x}\sin x\ln 2$

(17)	If $f(x)=\tan^{-1}(e^{2x})$, then $f'(x)=$			
	(A) $\dfrac{e^{2x}}{1+e^{2x}}$	(B) $\dfrac{2e^{2x}}{1-e^{2x}}$	(C) $\dfrac{2e^{2x}}{1+e^{4x}}$	(D) $\dfrac{1}{1+e^{4x}}$

(18)	An equation for tangent line to $f(x)=\sqrt{x}$ at the point $(1,0)$ is:			
	(A) $y=2x-1$	(B) $2y-3x=-1$	(C) $y-x=-1$	(D) $2y-x=-1$

(19)	If f has a local maximum or minimum at c, then c is a critical number of f.	
	(A) True	(B) False

(20)	$\lim\limits_{\theta\to 0}\dfrac{\sin(2\theta)}{5\theta}=$			
	(A) 2	(B) 5	(C) $\dfrac{2}{5}$	(D) $\dfrac{5}{2}$

(21)	$\lim\limits_{x\to 2}\dfrac{x^2+x-6}{x-2}=$			
	(A) 0	(B) 5	(C) -1	(D) Does not exist

(22)	$\lim\limits_{x\to\infty}\dfrac{3x^2-2}{x^2+5}=$			
	(A) 3	(B) 1	(C) -1	(D) Does not exist

(23)	$\lim_{x \to 7} \dfrac{\sqrt{x+2}-3}{x-7} =$			
	(A) 0	(B) $\frac{1}{7}$	(C) $\frac{1}{6}$	(D) Does not exist

(24)	The function $f(x) = \dfrac{x-5}{x^2-3x+2}$ is discontinuous at			
	(A) $x=3,\ x=-2$	(B) $x=-1,\ x=-2$	(C) $x=1,\ x=2$	(D) $x=0,\ x=-1$

(25)	The value of the constant c that make the function $f(x) = \begin{cases} x^2+2x, & x \neq 2 \\ cx^3, & x = 2 \end{cases}$ continuous at $x=2$ is			
	(A) -1	(B) 0	(C) 1	(D) 2

(26)	If $e^{-x} = 5$, then $x =$			
	(A) $x=0$	(B) $x=5$	(C) $x=-\ln 5$	(D) $x=\ln 5$

(27)	If $\ln(3-2x) = 4$, then $x =$			
	(A) $x = \dfrac{3-e^2}{4}$	(B) $x = \dfrac{3+e^4}{2}$	(C) $x = \dfrac{4-e^3}{2}$	(D) $x = \dfrac{3-e^4}{2}$

(28)	The domain of the function $y = \sin^{-1} x$ is			
	(A) $(-1,1)$	(B) $(-\infty,\infty)$	(C) $(1,\infty)$	(D) $[-1,1]$

(29)	The inverse function of $f(x) = 2x^2+5$ is	
	(A) $f^{-1}(x) = \sqrt[3]{\dfrac{x-5}{2}}$	(B) $f^{-1}(x) = \sqrt{\dfrac{x+5}{2}}$
	(C) $f^{-1}(x) = \sqrt{\dfrac{x-2}{5}}$	(D) $f^{-1}(x) = \sqrt{\dfrac{x-5}{2}}$

(30)	If $\sin\theta = \dfrac{2}{5},\ 0 \le \theta \le \dfrac{\pi}{2}$, then $\csc\theta =$			
	(A) $\dfrac{\sqrt{21}}{5}$	(B) $\dfrac{5}{\sqrt{21}}$	(C) $\dfrac{\sqrt{21}}{2}$	(D) $\dfrac{5}{2}$

(31)	Let $f(x) = 1-3x^2$ and $g(x) = \cos x$, then $(f \circ g)(x) =$			
	(A) $\cos(1+3x^2)$	(B) $1+\cos x$	(C) $1-3\cos^2 x$	(D) $\cos(1-3x^2)$

(32)	If the graph of $y = 8x^2 - 4$ is compressed vertically by a factor of 4, the equation for the new graph is			
	(A) $2x^2 - 1$	(B) $4x^2 - 1$	(C) $32x^2 - 16$	(D) $32x^2 + 16$

(33)	If the graph of $y = x^2$ is shifted up 2 units and left 3 units, the equation for the new graph is			
	(A) $y = (x-3)^2 - 2$	(B) $y = (x+3)^2 - 2$	(C) $y = (x+3)^2 + 2$	(D) $y = (x-3)^2 + 2$

(34)	The function $y = \frac{x^3}{1-\sqrt{x}}$ is classified as			
	(A) Polynomial	(B) Exponential	(C) Rational	(D) Algebraic

(35)	The function $f(x) = 1 + 3x^2 - x^4$ is			
	(A) Even	(B) Odd	(C) Neither even nor odd	(D) Even and odd

(36)	The solution set of the inequality $-5 \le 3 + 2x \le 15$ is			
	(A) $(-4, 6)$	(B) $(-4, 6]$	(C) $[-4, 6]$	(D) $[-4, 6)$

(37)	If f and g are functions, then $f \circ g = g \circ f$	
	(A)True	(B) False

(38)	The function $f(x) = 2x^2 + 5$ is one -to –one	
	(A) True	(B) False

(39)	The nth derivative $f^{(n)}(x)$ of the function $f(x) = xe^x$ is			
	(A) $e^x(x - n)$	(B) $e^x(x + 1)$	(C) $e^x(x + n)$	(D) $x + n$

(40)	Any polynomial is continuous everywhere; that is, it is continuous on $(-\infty, \infty)$.	
	(A) True	(B) False
