King Abdulaziz University | Final Exam – Math110

Rabigh College of Science and Arts | Date: 5/4/1440

Department of Mathematics | Time: 120 minutes

Name…… ID:……..... **A**

Choose the correct answer of the following questions:

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

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

(3)	The function $f(x)=x^3-3x^2+2$ is decreasing on:			
	(A) $(-\infty,0),(2,\infty)$	(B) $(0,2)$	(C) $(1,\infty)$	(D) $(1,2),(2,\infty)$

(4)	The function $f(x)=x^3-3x^2+2$ has a local maximum value at			
	(A) $x=3$	(B) $x=-1$	(C) $x=2$	(D) $x=0$

(5)	The function $f(x)=x^3-3x^2+2$ has a local minimum value at			
	(A) $x=3$	(B) $x=-1$	(C) $x=2$	(D) $x=0$

(6)	The graph of the function $f(x)=x^3-3x^2+2$ is concave upward on:			
	(A) $(-\infty,-1)$	(B) $(-\infty,1)$	(C) $(-1,\infty)$	(D) $(1,\infty)$

(7)	The graph of the function $f(x)=x^3-3x^2+2$ is concave downward on:			
	(A) $(-\infty,-1)$	(B) $(-\infty,1)$	(C) $(-1,\infty)$	(D) $(1,\infty)$

(8)	The graph of the function $f(x)=x^3-3x^2+2$ has an inflection point at:			
	(A) $(1,0)$	(B) $(-1,-2)$	(C) $(1,5)$	(D) $(2,-2)$

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

(10)	If $f(x)=\csc x$ then $f''(x)=$			
	(A) $\csc x(\csc^2 x+\cot^2 x)$	(B) $\csc^2 x+\cot^2 x$	(C) $\csc x(\csc^2 x-\cot^2 x)$	(D) $\csc x$

(11)	If $y=\frac{x+1}{x+2}$, then $y'=$			
	(A) $-\frac{1}{(x+2)^2}$	(B) $\frac{3}{(x+2)^2}$	(C) $-\frac{3}{(x+2)^2}$	(D) $\frac{1}{(x+2)^2}$

(12)	If $y=xe^{\cos x}$, then $y'=$			
	(A) $e^{\cos x}$	(B) $(1+x\sin x)e^{\cos x}$	(C) $(1-x\sin x)e^{\cos x}$	(D) $1-x\sin x$

(13)	If $x^2+y^2=3xy+7$, then $y'=$			
	(A) $\frac{2x+y}{3x-2y}$	(B) $\frac{3y-2x}{2y-3x}$	(C) $\frac{2x}{3-2y}$	(D) $\frac{2x}{y}$

(14)	If $y=\ln(\tan 3x)$, then $y'=$			
	(A) $\frac{\sec^2 3x}{\tan 3x}$	(B) $\frac{3\sec^2 3x}{\tan 3x}$	(C) $\frac{\sec^2 x}{\tan x}$	(D) $\frac{2\sec^3 2x}{\tan 2x}$

(15)	If $f(x)=(5)^{\tan x}$, then $f'(x)=$			
	(A) $-(\ln 5)(5)^{\tan x}\sec^2 x$	(B) $(5)^{\tan x}\sec^2 x$	(C) $(\ln 5)(5)^{\tan x}\sec^2 x$	(D) $(\ln 5)(5)^{\tan x}$

(16)	If $y=\log_7(x^2-3)$, then $y'=$			
	(A) $\frac{x}{\ln 7}$	(B) $\frac{1}{(x^2-3)\ln 7}$	(C) $\frac{2x}{x^2-3}$	(D) $\frac{2x}{(x^2-3)\ln 7}$

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

(18)	If $y=\sqrt{3x^2+6x}$, then $y'=$			
	(A) $\frac{6(x+1)}{\sqrt{3x^2+6}}$	(B) $\frac{x+6}{\sqrt{3x^2+6}}$	(C) $\frac{3(x+1)}{\sqrt{3x^2+6}}$	(D) $\frac{x+1}{2\sqrt{3x^2+6}}$

(19)	If $y=\tan^{-1}(x^3)$, then $y'=$			
	(A) $\frac{3x^2}{1+x^3}$	(B) $\frac{3x^2}{1+x^6}$	(C) $\frac{3x^2}{(1+x)^6}$	(D) $\frac{1}{1+x^6}$

(20)	The vertical asymptote of the graph of the function $y=\frac{x+3}{x+2}$ is			
	(A) $x=2$	(B) $x=-2$	(C) $y=1$	(D) $y=2$

(21)	The horizontal asymptote of the graph of the function $y=\frac{x+3}{x+2}$ is			
	(A) $x=2$	(B) $x=-2$	(C) $y=1$	(D) $y=2$

(22)	$\lim_{\theta\to 0}\frac{\sin\theta}{2\theta}=$			
	(A) 1	(B) 2	(C) $\frac{1}{2}$	(D) Does not exist

(23)	$\lim_{x\to 2}\frac{x^2-4}{x+2}=$			
	(A) 0	(B) 4	(C) 1	(D) Does not exist

(24)	$\lim_{x\to 0}\frac{\cos x}{x}=1$	
	(A) True	(B) False

(25)	$\lim_{x\to 0}\frac{\sqrt{x+9}-3}{x}=$			
	(A) 0	(B) $\frac{1}{7}$	(C) $\frac{1}{6}$	(D) Does not exist

(26)	If $e^{5-3x}=9$, then $x=$			
	(A) $x=\dfrac{9-\ln 5}{3}$	(B) $x=\dfrac{3-\ln 9}{5}$	(C) $x=\dfrac{5+\ln 9}{3}$	(D) $x=\dfrac{5-\ln 9}{3}$

(27)	If $\ln(x+6)=2$, then $x=$			
	(A) $x=e^2-6$	(B) $x=e-6$	(C) $x=e^2+6$	(D) $x=6-e^2$

(28)	Let $f(x)=\sin 5x$ and $g(x)=x^2+3$, then $(g\circ f)(x)=$			
	(A) $\sin^2 5x+3$	(B) $\sin 5(x^2+3)$	(C) $\sin(x^2+3)$	(D) $\sin^2 5x+3$

(29)	If f is continuous at a, then is f differentiable at a.	
	(A) True	(B) False

(30)	If the graph of $f(x)=e^x$ is stretched vertically by a factor of 2, the equation for the new graph is			
	(A) $f(x)=2e^x$	(B) $f(x)=e^{2x}$	(C) $f(x)=e^x$	(D) $f(x)=2e^{2x}$

(31)	If the graph of $y=\cos x$ is shifted up 5 units and left 7 units, the equation for the new graph is			
	(A) $y=\cos(x+7)-5$	(B) $y=\cos(x+7)+5$	(C) $y=\cos(x-7)+5$	(D) $y=\cos(x+5)+7$

(32)	The function $y=x^2+\sqrt{x-2}$ is classified as			
	(A) Polynomial	(B) Exponential	(C) Algebraic	(D) Power

(33)	The function $f(x)=2-x^5$ is			
	(A) Even	(B) Odd	(C) Neither even nor odd	(D) Even and odd

(34)	The solution of the inequality $\|x-3\| \le 4$ is			
	(A) $(-1,7)$	(B) $(-\infty,-1)\cup(7,\infty)$	(C) $(-\infty,-1]\cup[7,\infty)$	(D) $[-1,7]$

(35)	The equation of the line passes through $(2,1)$ and $(1,6)$ is			
	(A) $5x+y=11$	(B) $5x-y=11$	(C) $x+5y=11$	(D) $-x+y=5$

(36)	If a circle has radius 10 cm, the length of the arc subtended by a central angle of $\frac{5\pi}{6}$ rad			
	(A) $\frac{25\pi}{3}$	(B) $\frac{25\pi}{6}$	(C) $\frac{50\pi}{3}$	(D) $\frac{\pi}{3}$

(37)	$\log_2 16-\log_2 8+\log_2 4=$			
	(A) 1	(B) 2	(C) 3	(D) 4

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

(39)	The rang of the function $y=3^x$ is			
	(A) $[0,\infty)$	(B) $(-\infty,\infty)$	(C) $(0,\infty)$	(D) $[3,\infty)$

(40)	The function $f(x)=\frac{\ln x}{x^2+1}$ is continuous on			
	(A) $(0,\infty)$	(B) $\mathbb{R}-\{1\}$	(C) $\mathbb{R}-\{-1\}$	(D) $(0,1)\cup(1,\infty)$