King Abdulaziz University	Final Exam – Math 110
Rabigh College of Science and Arts	Date: 12/8/1440
Department of Mathematics	Time: 120 minutes

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

Choose the correct answer of the following questions:

(1)	The critical numbers of the function $f(x)=x^3-3x^2-24x+30$ are:			
	(A) $x=2, x=-4$	(B) $x=1, x=3$	(C) $x=0, x=-3$	(D) $x=-2, x=4$

(2)	The function $f(x)=x^3-3x^2-24x+30$ is increasing on:			
	(A) $(-\infty,-2),(4,\infty)$	(B) $(-2,4)$	(C) $(2,-4)$	(D) $(-\infty,2),(-4,\infty)$

(3)	The function $f(x)=x^3-3x^2-24x+30$ is decreasing on:			
	(A) $(-\infty,-2),(4,\infty)$	(B) $(-2,4)$	(C) $(2,-4)$	(D) $(-\infty,2),(-4,\infty)$

(4)	The function $f(x)=x^3-3x^2-24x+30$ has a local maximum value at			
	(A) $x=-2$	(B) $x=4$	(C) $x=2$	(D) $x=-4$

(5)	The function $f(x)=x^3-3x^2-24x+30$ has a local minimum value at			
	(A) $x=-2$	(B) $x=4$	(C) $x=2$	(D) $x=-4$

(6)	The graph of the function $f(x)=x^3-3x^2-24x+30$ is concave upward on:			
	(A) $(-\infty,-1)$	(B) $(-\infty,1)$	(C) $(-1,\infty)$	(D) $(1,\infty)$

(7)	The graph of the function $f(x)=x^3-3x^2-24x+30$ is concave downward on:			
	(A) $(-\infty,-1)$	(B) $(-\infty,1)$	(C) $(-1,\infty)$	(D) $(1,\infty)$

(8)	The graph of the function $f(x)=x^3-3x^2-24x+30$ has an inflection point at:			
	(A) $(1,4)$	(B) $(-1,-58)$	(C) $(1,8)$	(D) $(2,-2)$

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

(10)	If $y=x^2e^{-x}$, then $y'=$			
	(A) $-2xe^{-x}$	(B) $2xe^{-x}$	(C) $xe^{-x}(2-x)$	(D) $xe^{-x}(x-2)$

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

(12)	If $y=\ln(\csc x)$, then $y'=$			
	(A) $-\cot x$	(B) $\cot x$	(C) $\frac{\cot x}{\csc x}$	(D) $-\frac{\cot x}{\csc x}$

(13)	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) $(\ln 5)(5)^{\tan x}$

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

(15)	If $y=x^{2x}$, then $y'=$			
	(A) $2x$	(B) $x^{2x}(1+\ln x)$	(C) $2x^{2x}(1+\ln x)$	(D) $1+\ln x$

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

(17)	If $f(x)=\tan^{-1}(2x)$ then $f''(x)=$			
	(A) $\frac{-16x}{1+4x^2}$	(B) $\frac{-16x}{\left(1+4x^2\right)^2}$	(C) $\frac{x}{\left(1+4x^2\right)^2}$	(D) $\frac{-16}{\left(1+4x^2\right)^2}$

(18)	If $y=\cot^3(4x)$, then $y'=$	
	(A) $-12\cot^2(4x)\csc^2(4x)$	(B) $-3\cot^2(4x)\csc^2(4x)$
	(C) $3\cot^2(4x)$	(D) $-4\cot^2(4x)\csc^2(4x)$

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

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

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

(22)	$\lim_{\theta\to 0}\frac{\sin 4\theta}{2\theta}=$			
	(A) 1	(B) 2	(C) 4	(D) Does not exist

(23)	$\lim\limits_{x\to 3}\dfrac{x^2-4x+3}{x-3}=$			
	(A) 0	(B) 4	(C) 2	(D) Does not exist

(24)	$\lim\limits_{x\to 0}\dfrac{\tan x}{x}=1$	
	(A) True	(B) False

(25)	$\lim\limits_{x\to 0}\dfrac{\sqrt{x+4}-2}{x}=$			
	(A) ∞	(B) $\frac{1}{4}$	(C) $\frac{1}{6}$	(D) Does not exist

(26)	If $e^{2x+7}=5$, then $x=$			
	(A) $x=\ln 7-5$	(B) $x=\dfrac{\ln 7-5}{2}$	(C) $x=\dfrac{\ln 5+7}{2}$	(D) $x=\dfrac{\ln 5-7}{2}$

(27)	If $\ln(x-3)=1$, then $x=$			
	(A) $x=e+3$	(B) $x=e-3$	(C) $x=e^2+3$	(D) $x=3-e$

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

(29)	If the graph of $y=\tan x$ is stretched horizontally by a factor of 3, the equation for the new graph is			
	(A) $y=\dfrac{\tan x}{3}$	(B) $y=3\tan x$	(C) $y=\tan(3x)$	(D) $y=\tan\left(\dfrac{x}{3}\right)$

(30)	The function $f(x)=\dfrac{\tan^{-1}x}{\sqrt{x-2}}$ is continuous on			
	(A) $(2,\infty)$	(B) $(-\infty,\infty)$	(C) $(1,\infty)$	(D) $(0,2)\cup(2,\infty)$

(31)	If the graph of $y=\ln x$ is shifted downward 2 units and to the right 9 units, the equation for the new graph is			
	(A) $y=\ln(x-9)-2$	(B) $y=\ln(x+9)-2$	(C) $y=\ln(x-9)+2$	(D) $y=\ln(x-2)-9$

(32)	The function $y=\cot x$ is classified as			
	(A) Polynomial	(B) Exponential	(C) Algebraic	(D) Trigonometric

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

(34)	The solution of the inequality $x^2+x-6\geq 0$ is			
	(A) $(-3,2)$	(B) $(-\infty,-3]\cup[2,\infty)$	(C) $(-\infty,-3)\cup(2,\infty)$	(D) $[-3,2]$

(35)	The solution of the inequality $\|2x-4\| \geq 6$ is			
	(A) $(-1,5)$	(B) $(-\infty,-1)\cup(5,\infty)$	(C) $(-\infty,-1]\cup[5,\infty)$	(D) $[-1,5]$

(36)	The equation for the line passes through $(-1,6)$ and parallel to the line $5x+y=1$ is			
	(A) $5x+y=1$	(B) $x-5y=1$	(C) $x+5y=6$	(D) $x-y=6$

(37)	If a circle has radius 5 cm, the length of the arc subtended by a central angle of $\frac{6\pi}{5}$ rad is			
	(A) 5π cm	(B) 5π rad	(C) 6π rad	(D) 6π cm

(38)	$\log_2 32 - \log_2 16 + \log_2 4 =$			
	(A) 1	(B) 2	(C) 3	(D) 4

(39)	The inverse function of $f(x)=(x-2)^3+4$ is	
	(A) $f^{-1}(x)=\sqrt[3]{x-2}+4$	(B) $f^{-1}(x)=\sqrt[3]{x-4}+2$
	(C) $f^{-1}(x)=\sqrt{x-4}+2$	(D) $f^{-1}(x)=\sqrt{x+4}-2$

(40)	The domain of the function $y=\sqrt[5]{x}$ is			
	(A) $[0,\infty)$	(B) $(-\infty,\infty)$	(C) $(0,\infty)$	(D) $[3,\infty)$