King Abdulaziz University
Rabigh College of Science and Arts
Department of Mathematics

Second Exam – Math110
Date: 18/7/1440
Time: 90 minutes

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

Choose the correct answer of the following questions:

(1)	$\lim_{x \to \frac{\pi}{4}} (\sin x + \cos x) =$			
	(a) $\frac{\sqrt{2}}{2}$	(b) $-\frac{\sqrt{2}}{2}$	(c) $\frac{2}{\sqrt{2}}$	(d) $-\frac{2}{\sqrt{2}}$

(2)	$\lim_{x \to 2} \frac{x^2 - x - 2}{x^2 - 5x + 6} =$			
	(a) $-\frac{1}{3}$	(b) $\frac{1}{3}$	(c) 3	(d) -3

(3)	$\lim_{x \to 0} \frac{(x-2)^2 - 4}{x} =$			
	(a) 2	(b) -2	(c) -4	(d) Does not exist

(4)	$\lim_{x \to 0} (-7x \cot x) =$			
	(a) 3	(b) -3	(c) 7	(d) -7

(5)	$\lim_{x \to 2} \frac{\sqrt{x+7} - 3}{x - 2} =$			
	(a) $\frac{1}{2}$	(b) $\frac{1}{6}$	(c) 6	(d) 2

(6)	If $\lim_{x \to 5} \left[\frac{f(x)}{2-x}\right] = -1$ then $\lim_{x \to 5} f(x) =$			
	(a) 0	(b) 1	(c) 2	(d) 3

(7)	$\lim_{x \to 0} \frac{\sin 6x}{\sin 3x} =$			
	(a) 2	(b) 3	(c) 6	(d) ٥

(8)	If $\lim_{x \to 3} f(x) = 6, \quad \lim_{x \to 3} g(x) = -3, \quad \lim_{x \to 3} h(x) = 1$, then $\lim_{x \to 3}\left[\frac{f(x)g(x)}{2h(x)}\right] =$			
	(a) -9	(b) 9	(c) 18	(d) -18

(9)	If $f(x) = \begin{cases} 2x+1 & ; \ x > 2 \\ x^2+1 & ; \ x < 2 \end{cases}$, then $\lim_{x \to 2} f(x) =$			
	(a) 3	(b) 5	(c) 1	(d) Does not exist

(10)	$\lim_{x \to 4^-} \frac{x+2}{x-4} =$			
	(a) ∞	(b) $-\infty$	(c) 0	(d) Does not exist

(11)	The function $f(x) = \begin{cases} \frac{x^2-1}{x-1} & \text{if } x \neq 1 \\ 2x^2 & \text{if } x = 1 \end{cases}$ is continuous at $x = 1$.	
	(a) True	(b) False

(12)	$\lim_{x \to \infty} \frac{x + x^3 + 4x^4}{1 - x^2 - 2x^4} =$			
	(a) 2	(b) -2	(c) 4	(d) ∞

(13)	$\lim_{x \to \infty} \frac{\sqrt{2x^2-1}}{x-6} =$			
	(a) 1	(b) 2	(c) $\sqrt{2}$	(d) ∞

(14)	$\lim_{x \to \infty} \left(\sqrt{x^2+1} - x\right) =$			
	(a) 4	(b) 0	(c) -2	(d) 2

(15)	The vertical asymptote of the graph of the function $y = \frac{x+1}{x-5}$ is			
	(a) $x = 1$	(b) $y = 1$	(c) $x = 5$	(d) $y = 5$

(16)	The horizontal asymptote of the graph of the function $y = \dfrac{x+1}{x-5}$ is			
	(a) $x = 1$	(b) $y = 1$	(c) $x = 5$	(d) $y = 5$

(17)	Any rational function is continuous on $\mathbb{R} = (-\infty, \infty)$.	
	(a) True	(b) False

(18)	$\lim\limits_{x \to 0} \dfrac{\sin(9x)}{3x} =$			
	(a) 3	(b) 9	(c) $\dfrac{1}{3}$	(d) Does not exist

(19)	$f(x) = \begin{cases} 4x & \text{if } x \neq 2 \\ x & \text{if } x = 2 \end{cases}$, then $\lim\limits_{x \to 2^+} f(x) =$			
	(a) 4	(b) ٢	(c) 8	(d) Does not exist

(20)	The function $f(x) = \begin{cases} cx^2 - 4 & \text{if } x \neq 2 \\ 2x & \text{if } x = 2 \end{cases}$ is continuous on $\mathbb{R}$ if $c =$			
	(a) 3	(b) 2	(c) 1	(d) 4

(21)	If $y = \sqrt{e}$ then $y' =$			
	(a) $\sqrt{e}$	(b) $\dfrac{1}{2\sqrt{e}}$	(c) 1	(d) 0

(22)	An equation for tangent line to $y = x^2$ at the point $(1,1)$ is			
	(a) $x - 2y = -3$	(b) $x + 2y = 1$	(c) $2x - y = -3$	(d) $2x - y = 1$

(23)	If $f(x) = \sec x$ then $f''(x) =$			
	(a) $\sec x(\sec^2 x + \tan^2 x)$	(b) $\sec x$	(c) $\sec x \tan x$	(d) $\sec x(\sec^2 x - \tan^2 x)$

(24)	The n^{th} derivative, $f^{(n)}(x)$ of the function $f(x) = xe^x$ is			
	(a) e^x	(b) $e^x(x+n)$	(c) $e^x(x-n)$	(d) $(x+n)$

(25)	If $y = x\sqrt[3]{x}$ then $\dfrac{dy}{dx} =$			
	(a) $\dfrac{3\sqrt{x}}{4}$	(b) $\dfrac{3\sqrt[3]{x}}{4}$	(c) $\dfrac{4\sqrt{x}}{3}$	(d) $\dfrac{4\sqrt[3]{x}}{3}$

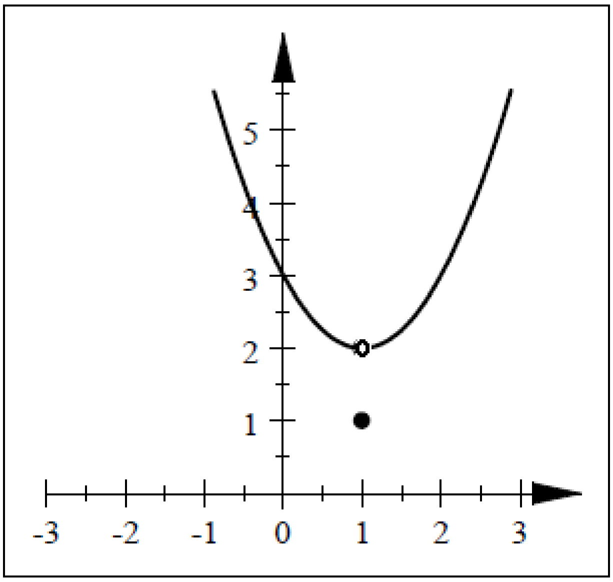
(26)	$\lim\limits_{\theta \to 0} \dfrac{\cos\theta - 1}{\theta} = 0$	
	(a) True	(b) False

(27)	If $y = e^{x}\cot x$ then $y' =$			
	(a) $\cot x - \csc^2 x$	(b) $e^{x}(\cot x - \csc^2 x)$	(c) e^{x}	(d) $e^{x}(\csc^2 x - \cot x)$

(28)	The 27^{th} derivative of $\sin x$ is			
	(a) $f^{(27)}(x) = \sin x$	(b) $f^{(27)}(x) = \cos x$	(c) $f^{(27)}(x) = -\sin x$	(d) $f^{(27)}(x) = -\cos x$

(29)	The derivative $f'(x)$ for the function $f(x) = \dfrac{\sin x}{x^2}$ is			
	(a) $\dfrac{\cos x}{2x}$	(b) $\dfrac{2x\sin x - x^2\cos x}{x^4}$	(c) $\dfrac{x^2\cos x - 2x\sin x}{x^4}$	(d) $\dfrac{\cos x - \sin x}{x^4}$

(30) Why the graph of the following function is discontinuous at x=1



(a) $f(1)$ undefined	(b) $\lim\limits_{x\to 1^+} f(x) \neq \lim\limits_{x\to 1^-} f(x)$	(c) $\lim\limits_{x\to 1} f(x) \neq f(1)$	(d) $\lim\limits_{x\to 1} f(x) = f(1)$