نموذج (٨) لامتحان شهادة إتمام الدراسة الثانوية العامة ٢٠٢٥ / ٢٠٢٦ م

المادة : الرياضيات البحتة باللغة الإنجليزية (الشعبة العلمية رياضيات) الزمن : ساعتان

First : the multichoice questions "each question for one mark"

(1)	If $e^y = xy\ then\ \frac{dy}{dx} =$						
(a)	$\frac{x}{y(x-1)}$	(b)	$\frac{y}{x(y-1)}$	(c)	$\frac{-y}{x(y-1)}$	(d)	$\frac{-x}{y(x-1)}$

(2)	$\int \frac{\cos(\ln x)}{x} dx =$.....						
(a)	$\sin(\ln x)$	(b)	$-\cos(\ln x)$	(c)	$\cos(\ln x)$	(d)	$-\sin(\ln x)$

(3)	$1 + \omega i + (\omega i)^2 + (\omega i)^3 + \ ... ... + (\omega i)^{95} =$						
(a)	0	(b)	1	(c)	ω	(d)	i

(4)	If the term free of x in the expansion of $(ax^2 - \frac{b}{x})^9$ equals 672, then $ab^2 =$						
(a)	1	(b)	2	(c)	-1	(d)	-2

(5)	If: $\vec{A} \cdot \vec{B} = \sqrt{3}\ and\ \vec{A} \times \vec{B} = \hat{\imath} + 2\hat{\jmath} + 2\hat{k}$, then the measure of the angle between the two vectors $\vec{A}$ and $\vec{B}$ =..... $^\circ$						
(a)	30	(b)	45	(c)	60	(d)	90

(6)	If: $x + 2y = 8$ then the maximum value of $xy\ is$						
(a)	4	(b)	8	(c)	16	(d)	32

(7)	If $\int (\ln x)dx = ax\ ln\ x + bx + c$, then $a + b =$						
(a)	0	(b)	1	(c)	-1	(d)	2

(8)	If : $3\vec{A} + 2\vec{B} = \vec{O}$ (where $\vec{O}$ is the zero vector) and the direction angles of $\vec{A}$ are $(120°, 120°, \theta°)$, then the directed angles of $\vec{B}$ can be		
(a)	$(120°, 120°, 45°)$	(b)	$(60°, 60°, 90°)$
(c)	$(60°, 60°, 135°)$	(d)	$(120°, 120°, 135°)$

(9)	If the coefficients of 8^{th} term and 18^{th} term in the expansion of $(x+y)^n$ are equal, then the coefficient of the middle term = …..						
(a)	$^{26}C_{13}$	(b)	$^{25}C_{13}$	(c)	$^{24}C_{12}$	(d)	$^{24}C_{13}$

(10)	If $\frac{dy}{dx} = e^{2x-y}$,where the curve of the function $y = f(x)$ passes through the origin point then ….		
(a)	$y = \ln(1+e^{2x}) - \ln 2$	(b)	$y = 2x$
(c)	$y = \ln(2x+1)$	(d)	$y = e^{2x} - 1$

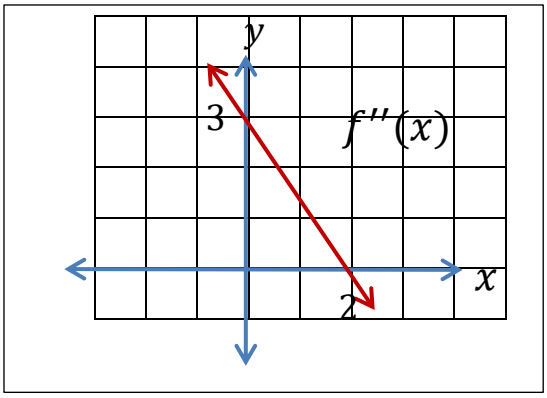
Second : the multichoice questions "each question for two marks"

(11)	The line : $x = 2y = 3z$ cuts the plan $x + 2y + 3z = 18$ at the point …….						
(a)	$(6,3,2)$	(b)	$(2,3,6)$	(c)	$(12,6,4)$	(d)	$(2,3,\frac{8}{3})$

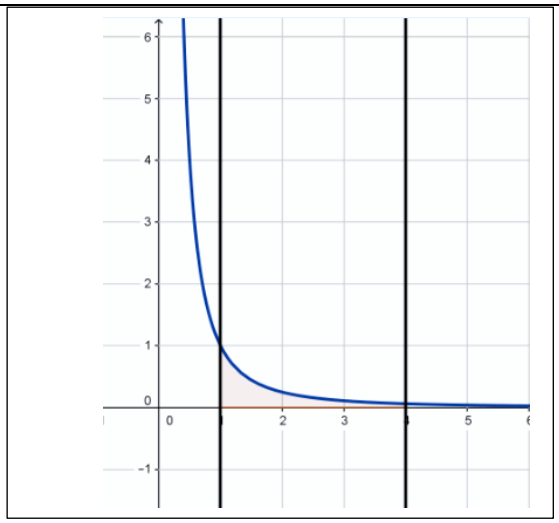
(12)	If : $Z_1 = 2-2i$, $Z_2 = \sqrt{3}+i$, $Z_3 = a+bi$ $where\ \|Z_1 Z_3\| = 16$ and the amplitude of $\frac{Z_3}{Z_2} = \frac{7\pi}{12}$,then (a,b) = ….						
(a)	$(4,4)$	(b)	$(4,-4)$	(c)	$(-4,4)$	(d)	$(-4,-4)$

(13)	If the measure of the angle between the two lines $L_1: x = 1$, $\frac{4-y}{m} = \frac{z+5}{1}$, $L_2: \vec{r} = (-\hat{j} + 5\hat{k}) + t(-\hat{\imath} + \hat{k})$ equals 60^o , then m = ……						
(a)	± 1	(b)	± 2	(c)	zero	(d)	$\frac{1}{2}$

(14)	The opposite figure represents the curve of the function $f''(x)$ if $f'(-1) = f'(5) = 0$, then the curve of $f(x)$ has local maximum value at x = ……						
(a)	zero	(b)	2	(c)	- 1	(d)	5



(15)	If $y = \sin\theta$, $x = \cos\theta$, then $y\frac{d^2y}{dx^2} + (\frac{dy}{dx})^2 =$						
(a)	0	(b)	1	(c)	-1	(d)	2

(16)	The opposite figure represents a part of the graph of the function $f: f(x) = \frac{1}{x^2}$ then the equation of the vertical line that divides the shaded region between the curve and over x-axis and the two straight lines x = 1 and x = 4 into two equal parts in area is $x =$ ..... 						
(a)	2	(b)	3	(c)	$\frac{8}{5}$	(d)	$\frac{6}{5}$

(17)	If the coefficient of x^2 in the expansion $(1+x)^{11}(1-x)^9$ equals						
(a)	2	(b)	-2	(c)	8	(d)	-8

(18)	The absolute maximum value of $f: f(x) = e^{-x^3}$ in the interval [-1 ,1] equals						
(a)	0	(b)	e	(c)	$\frac{-1}{e}$	(d)	1

Third: the essay questions "each question for two marks"

(19)	If $1, \omega, \omega^2$ *are the cubic roots of one* , prove that: $(\omega + \frac{1}{\omega})^2 + (\omega^2 + \frac{1}{\omega^2})^2 + (\omega^3 + \frac{1}{\omega^3})^2 + (\omega^4 + \frac{1}{\omega^4})^2 + (\omega^5 + \frac{1}{\omega^5})^2 + (\omega^6 + \frac{1}{\omega^6})^2 = 12$

(20)	If the rate of increasing of the surface area of a square at a certain moment equals three quarters of the rate of increasing of its perimeter numerically, find the length of its side at this moment.