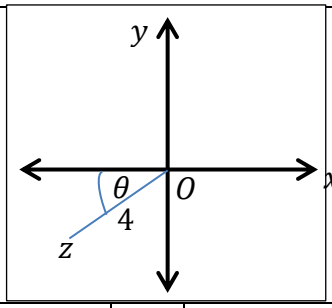
نموذج (٩) لامتحان شهادة إتمام الدراسة الثانوية العامة ٢٠٢٥ / ٢٠٢٦ م

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

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

(1)	If $f(x) = \ln(x+1)$ *then* $\frac{d^2y}{dx^2} =$						
(a)	$\frac{-1}{(x+1)^2}$	(b)	$\frac{1}{(x+1)^2}$	(c)	$\frac{1}{x+1}$	(d)	$\frac{-1}{x+1}$

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

(3)	If the complex number $z = -2\sqrt{3} - 2i$ is represented on Argand's plane as opposite figure , then $\theta = \cdots°$ 						
(a)	150	(b)	210	(c)	30	(d)	120

(4)	In the expansion $x(x+2)^n$ according to the descending power of x if the coefficient of the fifth term equals 240 then the value of n = ...						
(a)	5	(b)	6	(c)	7	(d)	8

(5)	If: $\lVert(20,15,10)\rVert = k\lVert(4,8,6)\rVert$ then k =.....						
(a)	$\pm\frac{5}{2}$	(b)	$\frac{5}{2}$	(c)	$\pm\frac{12}{5}$	(d)	$\frac{12}{5}$

(6)	If, a, b *and* c *are three variables where* $c = ab$ *, if* $a + 4b = 64$ Then the maximum value of c equals						
(a)	8	(b)	32	(c)	512	(d)	256

(7)	$\int e^x \cos x \sin x\, dx = \cdots + c$		
(a)	$\frac{1}{5}e^x(\sin 2x - 2\cos 2x)$	(b)	$\frac{1}{10}e^x(\sin 2x - 2\cos 2x)$
(c)	$\frac{1}{5}e^x(2\sin 2x - \cos 2x)$	(d)	$\frac{1}{10}e^x(2\sin 2x - \cos 2x)$

(8)	If: $\vec{A} = (8, 4\sqrt{2}, 4\sqrt{2})$ then the measure of the angle that $\vec{A}$ makes with the coordinates plane x y is …. °						
(a)	30	(b)	45	(c)	60	(d)	75

(9)	The coefficient of x^3 in the expansion $(x^2 + 2x + 1)^6$ equals …..						
(a)	84	(b)	66	(c)	495	(d)	220

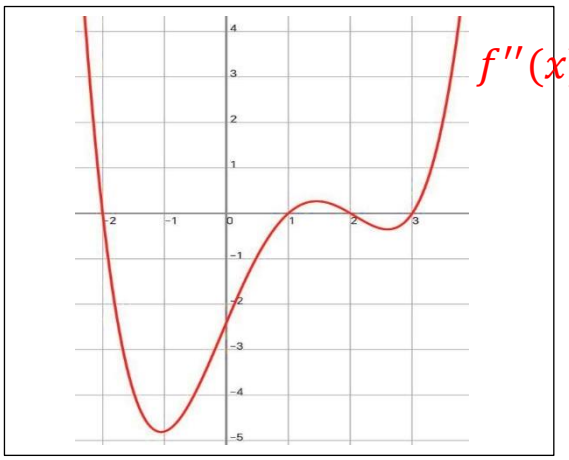
(10)	The equation of the curve $y = f(x)$,where $\frac{d^2y}{dx^2} = 6x$, and the equation of the tangent at (-1,8) is : $-5x - y + 3 = 0$ equals …..		
(a)	$y = x^3 - 8x + 1$	(b)	$y = x^3 + 8x + 1$
(c)	$y = x^3 - 5x + 3$	(d)	$y = x^3 - 8x - 1$

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

(11)	The sine of the angle that the plane $4x + 3y + 12z = 15$ makes with the positive direction of $x-$ axis is …….						
(a)	$\frac{3}{13}$	(b)	$\frac{4}{13}$	(c)	$\frac{3\sqrt{17}}{13}$	(d)	$\frac{3\sqrt{10}}{13}$

(12)	If the complex number $z = \frac{1+3i}{2+i}$, then number $\overline{z^3}$ in the exponential form is ….						
(a)	$4e^{\frac{3\pi}{4}i}$	(b)	$2\sqrt{2}\, e^{\frac{3\pi}{4}i}$	(c)	$2e^{\frac{-\pi}{4}i}$	(d)	$2\sqrt{2}\, e^{\frac{-3\pi}{4}i}$

(13)	If the line : $x = 3y = az$ parallel to the plane : $x + 3y + 2z + 4 = 0$ Then the value of a =…….						
(a)	3	(b)	2	(c)	1	(d)	-1

(14)	The opposite figure: represents the curve of the function $f''(x)$ Then the curve of the function $f(x)$ is convex upward in the interval 						
(a)	$]-1,2[$	(b)	$]-2,1[\cup]2,3[$	(c)	$]1,2[\cup]3,\infty[$	(d)	$]-2,3[$

(15)	If $f(x)=2x^3-5x^2+4x-1$,and $f''\left(\frac{7}{6}\right)+4m=2$. *then the value of* $m=\cdots$.						
(a)	$\frac{1}{2}$	(b)	$\frac{-1}{2}$	(c)	1	(d)	-1

(16)	The volume of the solid generated by revolving the region bounded by the curve $y=\sqrt{ax+b}$,and the lines $x=0$, $x=a$ (where a and b are positive constants) a complete revolution about $x-axis$ equals ……cubic unit						
(a)	$\pi(a^2+ab)$	(b)	$\pi(\frac{1}{2}a^3+ab)$	(c)	$\pi(a+b)$	(d)	$\pi(a^2+b)$

(17)	In the expansion $(ax+3)^{11}$ according the descending powers of x. If the ratio between the coefficients of 4^{th} term and 3^{rd} term as $9:5$, then $a=\ldots$						
(a)	3	(b)	5	(c)	9	(d)	11

(18)	$f:\left[\frac{1}{e},e^2\right]\to\mathbb{R}$, $f(x)=\frac{\ln x^4}{3x}$, then the absolute maximum value equals ...						
(a)	$\frac{4}{3e}$	(b)	$\frac{4e}{3}$	(c)	$\frac{8}{3e^2}$	(d)	$4e$

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

(19)	If $1 , \omega , \omega^2$ are the cubic roots of one, prove that: $(1 + \omega^2 + 2\omega)^{3n} + (1 + \omega + 2\omega^2)^{3n} = 2, \quad (n \in \mathbb{Z}^+)$

(20)	A man stands at 25 meter of the base of a tower whose height is 100 meter observing the elevation angle of a body that falls with constant speed 3 meter/sec. Find the rate of change of the elevation angle of the body when the body at height 25 meter from the base of the tower