

نموذج (٣) لامتحان شهادة إتمام الدراسة الثانوية العامة ٢٠٢٥ / ٢٠٢٦ م

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

First: Multiple choice questions” one mark for each item

(1)	The principle amplitude of the complex number $e^{\frac{4}{3}\pi i} = \dots\dots\dots$						
(a)	$\frac{-2\pi}{3}$	(b)	$\frac{2\pi}{3}$	(c)	$\frac{\pi}{3}$	(d)	$\frac{-\pi}{3}$
(2)	The term free of x in the expansion of $x^3\left(\frac{1}{x}-x\right)^7$ is						
(a)	T_5	(b)	T_4	(c)	T_3	(d)	T_2
(3)	If $\vec{A}=(-1, 1, 1)$, $\vec{AB}=(1, 2, 3)$, then $\ \vec{B}\ = \dots\dots\dots$ length unit						
(a)	$\sqrt{7}$	(b)	4	(c)	5	(d)	$\sqrt{29}$
(4)	If $e^{-x} = y$, then $e^x \cdot y' = \dots\dots\dots$						
(a)	- 1	(b)	1	(c)	e	(d)	- e
(5)	If $y = f(x)$ and $\frac{dy}{dx} - 4x^3 = 2x + 3$, $f(1) = 1$, then $f(-1) = \dots\dots\dots$						
(a)	- 5	(b)	- 1	(c)	1	(d)	3
(6)	The measure of the angle between the straight line $\frac{1}{2}x = \frac{1}{3}y = \frac{1}{4}z$ and the plane $(4, 6, 8) \cdot \vec{r} = 6$ equals						
(a)	0°	(b)	45°	(c)	90°	(d)	180°

(7)	The coefficient of x^{-n} in the expansion of $\left(\frac{1}{x^{2n}} - x^n\right)^5$ equals			
(a)	$-{}^5C_3$	(b)	5C_4	(c) 5C_3 (d) $-{}^5C_4$
(8)	If the slope of the tangent to the curve of the function $y = f(x)$ at any point (x, y) on the curve equals $\frac{1}{y\sqrt{x}}$ and the curve passes through the point $(1, 2)$, then the equation of this curve is			
(a)	$4x^2 = \sqrt{y}$	(b)	$4y^2 = \sqrt{x}$	(c) $x^2 = 4\sqrt{y}$ (d) $y^2 = 4\sqrt{x}$
(9)	The volume of the solid generated by revolving the region bounded by the curve of the function $f : f(x) = \sqrt{2}e^x$ and the straight lines $x = 1, x = 0$ a complete revolution about x - axis equals volume unit			
(a)	$\pi(e^2 - 1)$	(b)	$\sqrt{2}\pi(e - 1)$	(c) $\sqrt{2}(e^2 - 1)$ (d) $\sqrt{2}(e - 1)$
(10)	If $f(x) = x + 2\cos x$ where $x \in]0, 2\pi[$, then the function f has a local maximum value when $x =$			
(a)	$\frac{\pi}{6}$	(b)	$\frac{5\pi}{6}$	(c) $\frac{\pi}{3}$ (d) $\frac{2\pi}{3}$
Second: Multiple choice questions” two marks for each item:				
(11)	If the two straight lines $L_1 : \frac{x-1}{2} = \frac{2-y}{4}, z = 5$ and $L_2 : \vec{r} = (4, -1, 0) + t(1, m, 5)$ are orthogonal, then $m =$			
(a)	$\frac{1}{2}$	(b)	2	(c) $-\frac{1}{2}$ (d) -2
(12)	If f is a polynomial even function and $\int_0^3 f(x) dx = 6$, then $\int_{-3}^3 [f(x) - 6] dx =$			

2

(a)	24	(b)	12	(c)	- 24	(d)	- 12
(13)	ABCD is a rectangle in which AB = 6cm , BC = 8 cm , then $\overrightarrow{AD} \cdot \overrightarrow{CA} = \dots\dots\dots cm^2$						
(a)	- 64	(b)	- 48	(c)	48	(d)	64

(14)	If $A(3,1,4)$, $B(1, 3, 0)$, then the equation of the plane which is perpendicular to $\overline{AB}$ from its midpoint is.....						
(a)	$x + y - 2z = 4$	(b)	$x - y - 2z = 4$	(c)	$x - y + 2z = 4$	(d)	$x + y + 2z = 4$

(15)	If $y = \ln x$, $x = z^3$, then $\frac{dy}{dz} = \dots\dots\dots$ at $x = e^3$						
(a)	$\frac{3}{e}$	(b)	$\frac{e}{3}$	(c)	$3e^2$	(d)	$\frac{e^2}{3}$

(16)	If $f(x) = \sqrt[3]{x^2 - 1}$, $x \in [-1, 2]$, then the function f has an absolute minimum value at $x = \dots\dots\dots$						
(a)	2	(b)	1	(c)	- 1	(d)	zero

(17)	The ratio between the two middle terms in the expansion of $\left(x + \sqrt{5}^7 x - \sqrt{5}^7 \right)$ respectively according to the ascending powers of x is						
(a)	$\frac{-x^2}{5}$	(b)	$\frac{-11x^2}{20}$	(c)	$\frac{-5}{x^2}$	(d)	$\frac{-20}{11x^2}$

(18)	If $y = f(x)$ where $y = \frac{1}{3}x^3 + x^2 - 2x$, then the curve of the function y is convex upwards when $x \in \dots\dots\dots$						
(a)	$] -1, 2[$	(b)	$] -1, \infty [$	(c)	$] -\infty, -1[$	(d)	$R - [-1, 2]$

Third: essay questions “two marks for each question:

(19)	If $Z_1 = e^{\frac{\pi}{3}i}$ and $Z_2 = \left(\sin \frac{\pi}{6} + i \cos \frac{\pi}{6} \right)$, find $Z_1 + Z_2$ in the exponential form.						
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(20)	A child slipped on a slide on the shape of the curve of the function $f(x) = e^x$. If the velocity of the y-coordinate of the child's path equals (e) velocity unit when x - coordinate equals 1 length unit, find the velocity of x - coordinate at the same moment.						
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