الامتحان الوطني الموحد للبكالوريا
المسالك الدولية – خيار أنجليزية
الدورة الاستدراكية 2019
- عناصر الإجابة -

RR24E

المملكة المغربية
وزارة التربية الوطنية والتكوين المهني والتعليم العالي والبحث العلمي

المركز الوطني للتقويم والامتحانات والتوجيه

المادة	الرياضيات	مدة الانجاز	4
الشعبة أو المسلك	شعبة العلوم الرياضية : (أ) و (ب) – خيار أنجليزية	المعامل	9

EXERCISE1			Indications of solutions	M
I-	1-	a-	The Verification that the discriminant of (E_α) is : $\Delta=\alpha^2$	0.25
		b-	The solutions of (E_α) are $\frac{1+i\sqrt{3}}{2}\alpha$ and $\frac{-1+i\sqrt{3}}{2}\alpha$	0.5
	2-		$\frac{1+i\sqrt{3}}{2}\alpha=\lvert\alpha\rvert e^{i(\lambda+\frac{\pi}{3})}$; $\frac{-1+i\sqrt{3}}{2}\alpha=\lvert\alpha\rvert e^{i(\lambda+\frac{2\pi}{3})}$	0.5
II-	1-	a-	$R(\Omega)=M_1$ and $R(M_1)=M_2$	0.25x2
		b-	Deduction.	0.25
	2-	a-	Verification.	0.25
		b-	Perpendicularity of (ΩM_2) and (OM_1)	0.5
		c-	Deduction.	0.25
	3-		$\forall\theta\in\mathbb{R},\quad \frac{z_2-\alpha}{z_1-\alpha}\div\frac{z_2-\lvert\alpha\rvert e^{i\theta}}{z_1-\lvert\alpha\rvert e^{i\theta}}\in\mathbb{R}$	0.5

EXERCISE2	Indications of solutions	M
1-	Let A be the event : " The balls numbered 1, 2 and 3 are successively picked in this order " $P(A)=\frac{\text{Card }A}{\text{Card }\Omega}=\frac{(n-2)(n-3)!}{n!}=\frac{1}{n(n-1)}$	1
2-	Let B the event :" The balls 1, 2 and 3 are picked sortent (not necessarily in this order) "	1

	$P(B)=\dfrac{\text{Card }B}{\text{Card }\Omega}=\dfrac{C_n^3(n-3)!}{n!}=\dfrac{1}{3!}$	
3-	$X_n(\Omega)=\{3,....,n\}$ $\forall k\in X_n(\Omega)\quad P(X_n=k)=\dfrac{\text{Card}(X_n=k)}{\text{Card}\Omega}=\dfrac{C_3^1C_{k-1}^2 2A_{n-3}^{k-3}(n-k)!}{n!}$ $=\dfrac{3(k-1)(k-2)}{n(n-1)(n-2)}$	1

EXERCISE3		Indications of solutions	M
1-	a-	$(\vec{e_1},\vec{e_2})$ is a basis of V_2	0.25
	b-	Verification.	0.25
	c-	$\forall(X,X',Y,Y')\in\mathbb{R}^4\ \ (X\vec{e_1}+Y\vec{e_2})*(X'\vec{e_1}+Y'\vec{e_2})=XX'\vec{e_1}+YY'\vec{e_2}$	0.25
2-	a-	The commutativity of the law $*$	0.25
	b-	The associativity of the law $*$	0.25
	c-	$\vec{e_1}+\vec{e_2}$ is the identity of the law $*$	0.25
	d-	$(V_2,+,*)$ is an unitary commutative ring.	0.25
3-	a-	$(E_{\vec{u}},+)$ is a sub-group of the group $(V_2,+)$	0.25
	b-	$(E_{\vec{u}},+,.)$ is a sub space of the real vector space $(V_2,+,.)$	0.25
	c-	Direct Implication ....0.25 Reciprocal Implication 0.25	0.5
4-	a-	φ is an homomorphism from $(\mathbb{R}^*,\times)$ to $(E_{\vec{u}},*)$ ....0.25 φ is a bijection from $\mathbb{R}^*$ to $E_{\vec{u}}$ 0.25	0.5
	b-	$(E_{\vec{u}},+,*)$ is a commutative field	0.25

EXERCISE4			Indications of solutions	M
Part I	1-	a-	$\lim\limits_{x\to -1^+} g(x)=2$	0.25
		b-	$\lim\limits_{x\to +\infty} g(x)=-\infty$	0.5
	2-		Differentiability of g on I .... 0.25 $(\forall x\in I)\quad g'(x)=-2(1+2x)\ln(1+x)$ 0.25	0.5
	3-	a-	Existence of α ....0.25 Unicity of α 0.25	0.5
		b-	Verification.	0.25
		c-	$(\forall x\in]-1,\alpha[)\qquad 0<g(x)$ ....0.25 $(\forall x\in]\alpha,+\infty[)\qquad g(x)<0$ 0.25	0.5
Part II	1-	a-	Calculus of $\lim\limits_{x\to -1^+} f(x)$ ....0.25 Graphical interpretation of the result.........................0.25	0.5
		b-	Calculus of $\lim\limits_{x\to +\infty} f(x)$ ....0.25 Graphical interpretation of the result 0.25	0.5
	2-	a-	Differentiability of f on I ....0.25 $(\forall x\in I)\quad f'(x)=\dfrac{g(x)}{(1+x)(1+x^2)^2}$ 0.5	0.75
		b-	The variations of f on I	0.5
		c-	Vrification : $f(\alpha)=\dfrac{1}{2\alpha(1+\alpha)}$ ....0.5 $(\forall x\in I)\qquad f(x)\le\dfrac{1}{2\alpha(1+\alpha)}$ 0.25	0.75
	3-	a-	The equation of the tangente (T) of (C) at the point of abscisse 0	0.25
		b-	$(\forall x>0)\quad \ln(1+x)<x$	0.5

		c-	Dduction : $(\forall x>0) \quad f(x)<x$	0.25
		d-	Graphical representation of (T) ....0.25 Graphical representation of (C) 0.75	1
Part III	1-	a-	The change of the variable : $J=\frac{\pi}{8}\ln 2$	1
		b-	$\mathcal{A}=(\int_0^1 \lvert f(x)-x\rvert dx)\times u.a=(\int_0^1 (x-f(x))dx)\times 4cm^2$ $=(2-\frac{\pi\ln 2}{2})cm^2$	0.5
	2-		By the method of integration by parts : $K=\frac{\pi\ln 2}{8}$	1