

الرقم :

الإسم :

المدة : ساعتان

مسابقة في الرياضيات الإنكليزي

إرشادات عامة:

- يسمح بإستعمال آلة حاسبة غير قابلة للبرمجة
- يمكن الإجابة على المسائل بالترتيب الذي تريد
- يرجى الإجابة بخط واضح ومرتب
- العلامة القصوى من 30

1st exercise: (6½ pts)

In the following table, only one of the proposed answers to each question is correct. Write the number of each question and the corresponding answer, and **justify**.

No.	Questions	Answers												
		A	B	C										
1.	If x, y and z are respectively proportional to 5, 7, 9 and $2x - y + 3z = 180$ then (1½ pts)	$x + y + z = 126$	$x + y + z = 130$	$x + y + z = 90$										
2.	In a rectangle, given L : length, W : width, A : area. If a new rectangle is obtained by enlarging L by 20% and reducing W by 20% then a new area A' is obtained. So, the new rectangle is : (1½pts)	A reduction of the old rectangle by 4%	An enlargement of the old rectangle by 4%	Congruent to the old rectangle										
3.	If x is a real number in the interval $[-2; 5[$ and also $-8 \leq x < 5$, then x belongs to (1 pt)	$[-2; 5[$	$] -2; 5[$	$] -2; 5]$										
4.	The couple solution of the system $\begin{cases} 6 \cos(\alpha) - 4\sqrt{2} \sin(\beta) = -1 \\ 2 \cos(\alpha) + \sqrt{2} \sin(\beta) = 2 \end{cases}$ is: (1½ pts) (Note: Solve the system where α and β are acute angles)	$\alpha = 60^\circ$ and $\beta = 45^\circ$	$\alpha = 45^\circ$ and $\beta = 60^\circ$	$\alpha = 30^\circ$ and $\beta = 45^\circ$										
5.	Consider the following statistical distribution: <table border="1" style="margin-left: 20px;"> <tr> <td>Values x_i</td> <td>x_1</td> <td>x_2</td> <td>x_3</td> <td>x_4</td> </tr> <tr> <td>Frequencies n_i</td> <td>n_1</td> <td>n_2</td> <td>n_3</td> <td>n_4</td> </tr> </table> If y is a new variable such that $y_i = 10x_i - 4$ and \bar{x} is the mean of the old variable x then the mean \bar{y} of the new variable will be (Note: Show your detailed justification) (1 pt)	Values x_i	x_1	x_2	x_3	x_4	Frequencies n_i	n_1	n_2	n_3	n_4	$\bar{y} = 10\bar{x} - 4$	$\bar{y} = 10\bar{x}$	$\bar{y} = \bar{x}$
Values x_i	x_1	x_2	x_3	x_4										
Frequencies n_i	n_1	n_2	n_3	n_4										

2nd exercise: (5½ pts)

1) α is the measure of an acute angle such that $\cos(\alpha) = m$.

Justify which of the following propositions below is correct about m :

a) $m = \frac{4\sqrt{2}}{9}$ b) $m = -\frac{4\sqrt{2}}{9}$ c) $m = \frac{9}{4\sqrt{2}}$ (1 pt)

2) Deduce the numerical values of $\sin(\alpha)$ and $\tan(\alpha)$. (1½ pts)

3) If (d) is a decreasing straight-line in an orthonormal system ($x'Ox; y'Oy$) passing through the point $D(-1; 4)$ and making an acute angle α with the x -axis, then determine the equation of (d). (1pt)

4) Without using the calculator, show that: $A = \frac{2(\cos 60^\circ + \sin 45^\circ)}{\tan 68^\circ \times \tan 22^\circ} \times (\sqrt{6} - \sqrt{3})$ and $B = \frac{\sqrt{3}}{3}$ are reciprocals. (2pts)

