
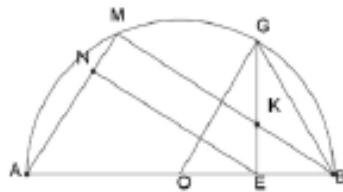


المادة: الرياضيات الشهادة: المتوسطة نموذج رقم -3- المدة : ساعتان	الهيئة الأكاديمية المشتركة قسم : الرياضيات	 المركز التربوي للبحوث والإنماء
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أسس التصحيح (تراعي تعليق الدروس والتوصيف المعدل للعام الدراسي ٢٠١٦-٢٠١٧ وحتى صدور المناهج المطوّرة)

### Answer keys

I.	1)	True Expand both expressions or: $(-2x - 2)^2 = [-2(x + 1)]^2 = 4(x + 1)^2$	0,5
	2)	False The equation has no solution: a square can't be negative.	0,5
	3)	False $(\cos x)^2 = 1 - (\sin x)^2 = \frac{8}{9}$ ; $\cos x = \frac{2\sqrt{2}}{3}$	0,75
	4)	False Only -3 is the solution.	0,5
	5)	True because : $x^2 + 1 > 0$ for all $x$ ; and $2x - 5 > 0$ and $x > 2,5$ . The product of two positive numbers is positive.	0,75
II.	1)	$A = \frac{2\sqrt{7}}{6} = \frac{\sqrt{7}}{3} = \frac{\sqrt{7} \times \sqrt{7}}{3\sqrt{7}} = \frac{7}{3\sqrt{7}}$ , hence $A = B$	0,75
	2-a	we can show that: $\sqrt{2} \times (4 + \sqrt{2}) = 4\sqrt{2} + 2$	0,5
	2-b	$\frac{(\sqrt{32} + 2)^2}{(\sqrt{36} - 10 - \sqrt{2})^2} = \frac{(4\sqrt{2} + 2)^2}{(6 - 10 - \sqrt{2})^2} = \frac{(4\sqrt{2} + 2)^2}{(-4 - \sqrt{2})^2} = \frac{(4\sqrt{2} + 2)^2}{(4 + \sqrt{2})^2} =$ $\left(\frac{4\sqrt{2} + 2}{4 + \sqrt{2}}\right)^2 = (\sqrt{2})^2 = 2$ , and 2 is a natural number.	0,75
III.	A.1-a	AD = 3 and $x$ is positive, hence $x$ is between 0 and 3.	0,25
	A.1-b	DMBN is a parallelogram since opposite sides are parallel.	0,5
	A.1-c	AD = BC, since ABCD is a rectangle; and DM = NB, since DMBN parallelogram. Therefore AD - DM = BC - NB, and AM = NC = $x$	0,5
	2)	DM = 3 - $x$ , then area of the square = $(3 - x)^2$ .	0,25
	3)	Different ways: Area (DMBN) = Area (ABCD) - 2 x Area (AMB), because the triangles AMB and DCN are congruent. Area (DMBN) = $12 - 4x$	0,5
	B-1	$(12 - 4x) - (3 - x)^2 = (3 - x)(x + 1)$ .	0,5
	B-2	$x=3$ or $x = -1$ , both are rejected.	0,5
B-3-a	$(x+1)(3-x) = 3$ , then $x=2$ .	0,5	

	B-3-b	The area of parallelogram is 3 more than the area of square.	0,5
IV	1)	$\begin{cases} x + y = 47 \\ \frac{x}{2} + \frac{y}{3} = 17,5 \end{cases}$ same as $\begin{cases} y = 47 - x \\ 3x + 2y = 105 \end{cases}$	1
	2)	The two numbers are 7 and 40	1
V	1)	Figure.	0,5 + 0,25
	2)	For $x = 2$ , $2x - 1 = 3$ ; hence B is on (D). For $x = 3$ , $2x - 1 = 5$ ; hence C is not on (D).	0,25 0,25
	3) a	For $x = 3$ , $-\frac{1}{2}x + \frac{5}{2} = 1$ ; hence C is on (D').	0,25
	3) b	$\begin{cases} y = 2x - 1 \\ y = -\frac{1}{2}x + \frac{5}{2} \end{cases}$ therefore $2x - 1 = -\frac{1}{2}x + \frac{5}{2}$ ; $x = \frac{7}{5}$ et $y = \frac{9}{5}$ and $S(\frac{7}{5}; \frac{9}{5})$	0,25 0,5
	4)	I midpoint of [BC]. Therefore $I(\frac{5}{2}; 2)$ $R = IB = \frac{\sqrt{5}}{2}$	0,25 0,5
5)	$\vec{BA} = \vec{SC}$ , therefore : $x - 2 = 3 - \frac{7}{5}$ and $y - 3 = 1 - \frac{9}{5}$ $x = \frac{18}{5}$ and $y = \frac{11}{5}$ BSCA rectangle, so BSC is a right triangle at A ; and A is on the circle circumscribed about triangle BSC	0,5 0,5	
VI	1)		0,5
	2)a-	OG = BG (perpendicular bisector) ; OG = OB (radii) Therefore OG = BG = OB, and OBG equilateral. 2) b) $GE = \frac{R\sqrt{3}}{2}$ . 2) c) $\angle GMB = \frac{\angle GOB}{2} = 30$ degree.	0,75

3)	<p>BMA and BEK are right triangles and they have a common angle <math>\hat{B}</math>.</p> $\frac{BA}{BK} = \frac{AM}{KE} = \frac{MB}{EB};$ <p>therefore <math>BK \times BM = BA \times EB = 2R \times \frac{R}{2} = R^2</math></p>	0,75 0,5 + 0,5
4)	$\frac{MN}{AM} = \frac{BE}{BA} = \frac{1}{4}$	0,75
5-a	<p>a) <math>AM = \frac{AB}{2} = R</math> and <math>EN = \frac{3R\sqrt{3}}{4}</math>.</p>	0,5
5-b	<p>b) <math>BE = \frac{R}{2}</math> et <math>MN = \frac{R}{4}</math> and <math>MB = R\sqrt{3}</math></p> $\frac{3R\sqrt{3}}{4} + \frac{2R}{4} + \frac{R}{4} + \frac{4R\sqrt{3}}{4} = 7\sqrt{3} + 3$ <p><math>R = 4</math>.</p>	0,5 + 0,25