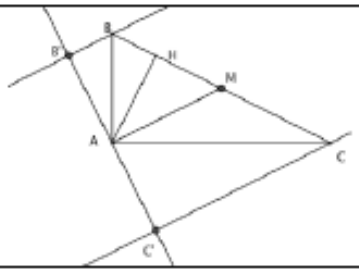
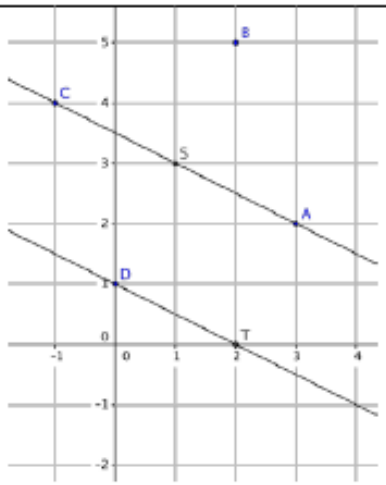
المركز التربوي للبحوث والإنماء	الهيئة الأكاديمية المشتركة قسم : الرياضيات	المادة:الرياضيات الشهادة: المتوسطة نموذج رقم -2- المدة : ساعتان

أسس التصحيح (تراعي تعليق الدروس والتوصيف المعدّل للعام الدراسي ٢٠١٦-٢٠١٧ وحتى صدور المناهج المطوّرة)

			Key answers	Mark
I-	1)		$A = 3^{24}(1+3+9) = 3^{24} \times 13$ A is a multiple of 13 since 3^{24} is a naturel number.	0.5 0.5
	2)	a)	$a^2 = 4(4+\sqrt{7})$; $b^2 = \frac{7}{2}+\frac{1}{2}+2\sqrt{\frac{7}{2}}\sqrt{\frac{1}{2}} = 4+\sqrt{7}$; $a^2 = 4b^2$	0.25 0.5
		b)	$a = -2b$	0.25
	3)		for all x ; $x^2 > 0$ *then* $-2x^2 < 0$ $-y < 0$, hence $\frac{-2x^2}{-y} > 0$	0.5 0.25 0.25
	4)		False. Before reduction: x is the price of a ball and 2x the price of 2 balls. After reduction: 1 ball: 0,85 x ; Price of 2 balls: $(0{,}85\ x) \times 2 = 0{,}85 \times (2x)$ The price of 2 balls decreased by 15% We can think in this way: if this student was right and if he buys 7 balls, then the seller should pay him because the reduction will be 105%	1

			Part A	Mark
II-	1)		$A(x) = -15x^2 + 14x + 8$	0.25
	2)		$A(x) = (1-x)(6x-8) + 16 - 9x^2$ $A(x) = 2(1-x)(3x-4) + (4-3x)(4+3x)$ $A(x) = 2(1-x)(3x-4) - (3x-4)(4+3x)$ $A(x) = (3x-4)(-2-5x)$	0.25 0.25 0.25
	3)		$A(x) = 0$, for $x = \frac{4}{3}$ or $x = -\frac{2}{5}$ $A(x) = 8$ $-15x^2 + 14x + 8 = 8$ $-15x^2 + 14x = 0$ $x(-15x+14) = 0$ $x = \frac{14}{15}$ or $x = 0$	0.25 0.25 0.25 0.25 0.25 0.5
	Part B			
	1)		$x \neq \frac{4}{3}$ and $x \neq -\frac{2}{5}$	0.5
	2)		$E(x) = \frac{x-3}{3x-4}$	0.25
	3)		$\frac{x-3}{3x-4} = \frac{1}{3}$, then $3x - 9 = 3x - 4$; the equation has no solution	0.5

III-	1)			0.25
	2)	Pythagoras: AC = 2a, so $BC^2 = 4a^2 + a^2$; with BC > 0, therefore $BC = a\sqrt{5}$ $AM = \frac{a\sqrt{5}}{2}$		0.25 0.25
	3)	a)	BMA isosceles and M is the principal vertex, therefore $\widehat{MAB} = \widehat{MBA}$; (AM) //(BB'), $\widehat{B'BA}$ and $\widehat{MAB}$ are alternate-interior angles, thus $\widehat{B'BA} = \widehat{MAB}$ then $\widehat{B'BA} = \widehat{MBA}$ and [BA) is the bisector of $\widehat{CBB'}$. Same for: [CA) bisector of $\widehat{BCC'}$.	0.5
		b)	Right angle and $\widehat{B'BA} = \widehat{CAC'}$, same complements $\frac{BB'}{AC'} = \frac{B'A}{C'C} = \frac{AB}{CA} = \frac{a}{2a} = \frac{1}{2}$	0.5 0.25
	4)	a)	By areas of ABC: $\frac{1}{2}AH \times BC = \frac{1}{2}\ AB \times AC$ OR Using the similar triangles BAH and ABC. $AH \times BC = AB \times AC$ and $AH = \frac{AB \times AC}{BC} = \frac{2a^2}{a\sqrt{5}} = \frac{2a}{\sqrt{5}} = \frac{2a\sqrt{5}}{5}$	0.5 0.5
		b)	A is a point on the bisector of $\widehat{CBB'}$; therefore A is at the same distance from the sides of the angle. So AH = AB'. Same for AH = AC'. Therefore $B'C' = 2AH = \frac{4a\sqrt{5}}{5}$ $BB' = \frac{1}{2}\ AC'$, using 3) b) then $BB' = \frac{a\sqrt{5}}{5}$ $CC' = 2B'A$, using 3) b). Hence $CC' = 2 \times \frac{2a\sqrt{5}}{5}$, using 4) a) $CC' = \frac{4a\sqrt{5}}{5}$	0.25 0.25 0.25 0.25

IV	1)	 although it is not requested, we have completed the drawing.		0.25
	2)	$AB^2 = (2-3)^2+(5-2)^2 = 1+9 = 10$; $AC^2 = 16+4 = 20$ $BC^2 = 9+1 = 10$; AB= BC et $AB^2 + BC^2 = AC^2$ Therefore ABC is right isoceles. The right angle is at B.		0.5 0.25
	3)	a)	ABCD is a square.	0.5
		b)	Different ways for calculation: using the midpoint S(1 ; 3) or $\overrightarrow{AD} = \overrightarrow{BC}$; D(0 ; 1)	0.5

	4)	a)	(DT) // (AC),slope: a $= \frac{y_A - y_C}{x_A - x_C} = \frac{-2}{4} = -\frac{1}{2}$ and D belongs to (DT), therefore $y = -\frac{1}{2}x + 1$.	0.5 0.25
		b)	Ordinate of T is equal to zero. T(2 ;0)	0.25
	5)	a)	$x = \sqrt{5}$ or $x = -\sqrt{5}$	0.25
		b)	S(1 ;3) ; $SA^2 = 5$ $MS^2 = SA^2$; $MS^2 = 5$ $(1-1)^2 + (m-3)^2 = 5$; $(m-3)^2 = 5$; $m - 3 = \sqrt{5}$ or $m - 3 = -\sqrt{5}$; $m = 3 + \sqrt{5}$ or $m = 3 - \sqrt{5}$	0.25 0.25 0.25

V	1)		[(6 × 14) + (4 × 12)] ÷ 10 = 13.2	1.5
	2)	a)	5 + 15 + 50 + 30 = 100	0.25
		b)	(50 + 30) ÷ 100 = 0.8 or 80%	0.5 + 0.25
		c)	Calculation of angles:	0,75

Number of mobile phones	0	1	2	3
Number of families	5	15	50	30
Angles	18°	54°	180°	108°

Circle graph

0.5 +
0.25