## 2007 Mathematics SG – Credit Level – Paper 2

## **Marking Instructions**

Award marks in whole numbers only

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
1	Ans: £684·70	
	• multiplying factor	• 1.045
	• power of 3	• $1 \cdot 045^3$
	• solution	• £684·70 <b>3KU</b>
Notes:		
(i)	for £684.70, £684.69, £685 or £684 with or with	hout working award $\frac{3}{3}$
(ii)	for multipliers <b>with working</b> of 0.955 -	$\rightarrow$ £522.59
	1.45 -	$\rightarrow$ £1829·17/8
	0.55 -	$\rightarrow$ £99·82/3 award $\frac{2}{3}$
(iii)	for a <b>final</b> answer of £627 from $(0.045 \times 600)$ +	-600 award $\frac{1}{3}$
(iv)	for an answer of £681 from $(0.045 \times 600 \times 3)$ +	600 award $\frac{0}{3}$
(v)	for an incorrect answer without working	award $\frac{0}{3}$
(vi)	for the final mark, the answer must be rounded	appropriately
(vii)	do not penalise premature rounding	

Question No	Give 1 mark for each ●	Illustrations of evidence for awarding each mark
2	Ans: 2.2, -1.5	
	• method	• substitution into quadratic formula
	• processing	<ul> <li>√124</li> </ul>
	• solution	• 2.19, -1.52
	• rounding	• 2·2, -1·5 <b>4K</b> U
Notes:		
alter	native evidence for 3 <sup>rd</sup> and 4 <sup>th</sup> marks	
(i)	3 <sup>rd</sup> mark (one solution and rounding) 4 <sup>th</sup> mark (another solution and rounding)	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
(ii)	only the first mark is available for candidates w	ho process to a negative discriminant

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
3 (a)	Ans: 24, 7	
	• mean	• 24
	• substitution into formula	• as far as 294 or 4326
	• processing	• $\sqrt{49}$
	• solution	• 7
		TRU
Notes:		$(\Sigma u)^2$
x	$x-\overline{x}$ $(x-\overline{x})^2$ $x^2$	$s = \sqrt{\frac{\sum (x - \overline{x})^2}{n}} \qquad s = \sqrt{\frac{\sum x^2 - \frac{(\sum x)}{n}}{n}}$
28 32	<u>4 16</u> <u>8 64</u> <u>1024</u>	$\sqrt[n-1]{n-1}$ $\sqrt[n-1]{n-1}$
14 19	-10 100 196 -5 25 361	$=\sqrt{\frac{294}{6}}$ $=\sqrt{\frac{4326-\frac{108}{7}}{7}}$
$\frac{18}{26}$	-6 36 324 676	$=\sqrt{49}$ $\bigvee$ 6
31	2         4         676           7         49         961	$= 7 \qquad \qquad -\sqrt{49} \\ = 7 \qquad \qquad = 7$
	294 4326	
(b)	Ans: valid comments	
	comparing means	• on average, more birds visit Erin's table
	• comparing standard deviations	• the number of birds visiting Luke's table
		varies more <b>2RE</b>
Notes		
(i)	responses about mean must give a compariso	n of number of hirds
	responses about mean must give a compariso	
(11)	responses about standard deviation must give	a comparison of variation or spread
unacco	eptable responses	
(a)	the average number of birds is more /	less.
(b)	the mean is more / less.	
(c)	the s.d is more/less.	

Question No	Give 1 mark for each ●	Illustrations of evidence for awarding each mark
4	<ul> <li>Ans: x &lt; 22</li> <li>dealing with denominator or constant</li> <li>solution</li> </ul>	• $x - 2 < 20$ or $\frac{x}{4} < 5\frac{1}{2}$ • $x < 22$
Notes:		280

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
5	Ans: £135	
	• valid strategy	• $110\% = \pounds 148.50$
	• processing	• $1\% = \pounds 1.35$
	• solution	• £135 <b>3KU</b>
Notes:		
(i)	for £135 with or without working	award $\frac{3}{3}$
(ii)	for £133.65 (90% of £148.50) with or without w	working award $\frac{0}{3}$
(iii)	for £163·35 (110% of £148·50) with or without	working award $\frac{0}{3}$

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
6	Ans: 27·2 km	
	• dealing with bearing	• $\angle ABC = 27^{\circ}$
	• valid strategy	• third angle and use of sine rule
	• correct substitution	• $\frac{a}{\sin 65^\circ} = \frac{30}{\sin 88^\circ}$
	• solution	• 27·2 <b>4RE</b>
Notes:		
(i) 1	use of the sine rule is the only valid strategy	
(ii) y	where the angle sum of triangle ABC is greater than 180° only the first mark is available	
(iii) I	beware: some candidates assume $\angle BCA = 90^{\circ}$ and use $\sin 65^{\circ} = \frac{BC}{30}$ to give BC = 27.18 km; in this case, only the first mark is available	

Question No	Give 1 mark for each ●	Illustrations of evidence for awarding each mark
7	Ans: $55 \cdot 84 \text{ cm}^2$	
	• fraction of area	• $\frac{64}{360}$
	• use of formula	• $\frac{64}{360} \times \pi \times 5^2$
	• all calculations correct	• $13.96 \times 4 = 55.84$ <b>3KU</b>
Notes:		<u> </u>
(i) f	or 55.84 with or without working	award $\frac{3}{3}$
(ii) th	he 3 <sup>rd</sup> mark is available only for a calculation in	volving $\pi$

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
8	Ans: 10 cm	
	• valid strategy in triangle PQR	• $A = \frac{1}{2} pr \sin Q$
	• substitution	• $15 = \frac{1}{2} \times 6 \times r \times \sin 30^\circ$
	• solution	• 10 <b>3RE</b>
Notes:	<u> </u>	
(i) e	vidence for the 1 <sup>st</sup> mark may be implicit in the	substitution
(ii) fo	or 5.77 (using $\frac{1}{2} pr \cos Q$ )	award a maximum of $\frac{2}{3}$
(iii) fo	or 5 (using $\frac{1}{2} pr$ )	award $\frac{0}{3}$

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
9	Ans: 384g	
	Method 1:	
	• valid strategy	• 32 and 35
	• processing	• $32 \times 7 = 224$
	• solution	• 160 + 224 = 384
	Method 2:	
	• valid strategy	• building up in multiples of 5 and 7 eg (50, 70), (100, 140) etc
	• processing	• leading to 160 and 224
	• solution	• 160 + 224 = 384 <b>3RE</b>
Notes:		I
(i) f	for 384 with no working	award $\frac{2}{3}$
(ii) f	For an attempt to solve by dividing by 12	award $\frac{0}{3}$
(iii) f	For a final answer of $67 (32 + 35)$	award $\frac{1}{3}$
(iv) t	he 3 <sup>rd</sup> mark is not available for a total greater th	nan 405 (160 + 245)

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
10	Ans: $143 \cdot 1^{\circ}, 216 \cdot 9^{\circ}$	
	• rearranging	• $\cos x^\circ = -\frac{4}{5}$
	• first solution	• 143·1°
	• solution	• 216.9°
		<b>3K</b> U
Notes:		
(i)	(i) for a wrong negative value of $\cos x^{\circ}$ , a maximum of $\frac{2}{3}$ is available (2 <sup>nd</sup> and 3 <sup>rd</sup> marks)	
(ii)	For a wrong positive value of $\cos x^{\circ}$ , a maximum of $\frac{1}{3}$ is available (3 <sup>rd</sup> mark)	
(iii)	ignore any values outwith the given domain	

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark
11 (a)	Ans: proof	
	starting process	• $A = (10 - x)(6 - x)$ or
		A = 60 - 10x - x(6 - x)
	• rearranging	• $A = x^2 - 16x + 60$ 2RE
Notes:		
(i) n	o marks are available for $A = (x-6)(x-10$	)) )
(b)	Ans: 4 cm	
	• forming equation	• $x^2 - 16x + 60 = 12$
	• factorising	• $(x-4)(x-12)$
	• solving equation	• 4, 12
	• final solution	• 4 4RE
Notes:	I	
(i) th	he 3 <sup>rd</sup> mark is available only for <b>both</b> possible a	answers
(ii) th	he 4 <sup>th</sup> mark is for a rejection of the invalid solut	tion
(iii) fo	or an answer of 4 without working	award $\frac{0}{4}$

Question No	Give 1 mark for each •	Illustrations of evidence for awarding each mark	
12 (a)	Ans: $113 \cdot 1 \text{ cm}^2$		
	• formula	• $V = \pi \times 3^2 \times 4$	
	• solution	• 113·1 <b>2KU</b>	
Notes:	1	1	
(i) 4	.52.4 (using $\pi d^2 h$ ) may be awarded the 2	2 <sup>nd</sup> mark	
(ii) 7	(using $\pi dh$ ) may be awarded the 2	2 <sup>nd</sup> mark	
(ii) f	or the use of any other wrong formula	award $\frac{0}{2}$	
(b)	Ans: 3.78 cm		
	• forming equation	• $\frac{2}{3}\pi \times r^3 = 113 \cdot 1$	
	• rearranging	• $r^3 = 54$	
	• solution	• 3·78 <b>3RE</b>	
Notes:	<u> </u>	<u> </u>	
(i) f	for $452.4 \rightarrow 216 \rightarrow 6.0$	award $\frac{3}{3}$	
(ii) f	for $75.4 \rightarrow 36 \rightarrow 3.3$	award $\frac{3}{3}$	
(iii) th	(iii) the third mark is available only for the cube root of a number		

Question No	Give 1 mark for each ●	Illustrations of evidence for awarding each mark
13	Ans: £19 600	
	• valid strategy	$\bullet  4x(140-x)=0$
	• finding roots	• 0, 140
	• finding midpoint	• 70
	• solution	• 19 600 <b>4RE</b>
Notes:		
(i)	(i) for the $1^{st}$ mark, the equation need not be explicit, thus 0, 140 alone is awarded the $1^{st}$ and $2^{nd}$ marks	
(ii)	statement of $x = 70$ leading to £19 600 may be awarded a maximum of $\frac{2}{4}$	
(iii)	any method involving trial and improvement receives no credit	

KU 24 marks RE 25 marks

## [END OF PAPER 2 MARKING INSTRUCTIONS]

FinalKU 45TotalsRE 45