UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2012 question paper

for the guidance of teachers

0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/42 Paper 4 (Extended), maximum raw mark 120

1	(a)	510	2	**M1** for 0.85×600
	(b) (i)	12.5	2	**M1** for $\dfrac{17500}{20000} \times 100$ soi or $\dfrac{20000 - 17500}{20000}$
	(ii)	155 www 3	3	**M2** for $\dfrac{161.2}{1.04}$ oe **or M1** for 1.04 or 104 seen
	(c)	3000	2	**M1** for $\div 14 \times 5$ $\qquad$ **[9]**
2	(a) (i)	125	1	
	(ii)	35	1	
	(b) (i)	35	1	
	(ii)	80 www 2	2	**M1** line extended from *R* parallel to *ST* **or** for line extended from *TS* parallel to *QP* **with** one extra angle found **or** extending *PQ* and one angle found
	(c) (i)	40	2	**M1** for recognising *OAT* or *OBT* = 90°
	(ii)	110	2	**M1** for 220° seen at centre **or** 70° seen as angle on circumference in alternate segment
	(iii)	9.40 (9.396 – 9.397)	3	**M2** for $2 \times 5 \times \sin 70°$ or $5^2 + 5^2 - 2.5.5 \cos 140$ oe **or M1** for identifying correct trig ratio or implicit cosine formula oe $\qquad$ **[12]**
3	(a)	9.95×10^{-5}	1	
	(b)	1.1×10^{-5}	1	
	(c)	9.9×10^{-5}	2	**M1** for figs 595 seen (can be implied by 9.92 or 9.916 to 9.917)
	(d)	1.05×10^{-4} or 1.06×10^{-4}	3	**M2** for $(1.0 \times 10^{-4}) \times 7 -$ their Σx **or M1** for $(1.0 \times 10^{-4}) \times 7$ soi or (sum of 6 values $+ x$) $\div 7 = 1.0 \times 10^{-4}$ $\qquad$ **[7]**

4	(a)	-1	1	
	(b)	$3, -3$	2	**B1** for 3, **B1** for -3
	(c)	$(x-2)^2 - 5 \text{ or } (x-2)(x-2) - 5$	M1	
		$x^2 - 2x - 2x + 4 - 5$	A1	$-4x$ can be allowed for $-2x - 2x$
	(d)	1	2	**B1** for $-4x - 1 = -5$ or better **or M1** for using intersection on reasonable sketch **[7]**
5	(a) (i)	13.4 (13.41 to 13.42)	2	**M1** for $18^2 - 12^2$ soi
	(ii)	48.1 or 48.2 (48.11 − 48.19)	2	**M1** for $\cos[A] = \dfrac{12}{18}$ oe
	(b)	Angle $FBE = \frac{1}{2}$ their **(a)(ii)**	M1	
		tan (their FBE or $\frac{1}{2}$ their **(a)(ii)**) = $\dfrac{\text{their (a)(i)}}{BE}$ oe	M1	
		$BE = 29.95$ to 30.05 **at least 4 figs**	A1	
	(c)	art 32.8 or 32.9	2	**M1** for $[FB^2 =]$ their $13.4(16..)^2 + 30.0^2$ oe
	(d)	14.3 (14.28 to 14.30….)	3	**M1** for $20^2 + 30^2 - 2 \times 20 \times 30 \cos(\frac{1}{2}$ their**(a)(ii)**) **A1** for 204.1 to 204.6 **[12]**

6	(a)	Correct sketch	3	**B1** for two branches with correct shape **B1** for lower crossing y-axis at approximately $(0, -6)$ **B1** for upper crossing or touching x-axis to right of $(1, 0)$ and left of $(4, 0)$
	(b)	$x = 1$	1	
	(c)	$y \le -5.83\ (-5.828..)$	**B1**	
		$y \ge -0.172\ (-0.1716$ to $-0.1715)$	**B1**	If **B0**, **SC1** for $y \le -5.8$ and $y \ge -0.17$
	(d)	2, 3	1	
	(e)	Correct sketch	2	**B1** for straight line with positive gradient, **B1** for line crossing y-axis at approximately -2
	(f)	$(-1.414, -6.243)\ (1.414, 2.243)$	2	**B1, B1** for each correct pair of co-ordinates If **B0** award **SC1** for answers given to other accuracy at least 2 or 4 or more decimal places **[11]**
7	(a)	4 www	3	**B1** for interest = 63 soi **M1** for correctly substituted simple interest formula oe **or** **M1** for $\frac{588}{525}$ **A1** for 112% soi
	(b)	14800	3	**M1** for 10000×1.05^n where n is an integer >1 oe **A1** for 14770 to 14780 **[6]**
8	(a) (i)	12	1	
	(ii)	5	1	
	(iii)	10	1	
	(b) (i)	Correct Venn diagram	3	**B1** for 0 in centre **B1** for 7, 2, 12 in correct positions **B1** for 5, 10, 4 in correct positions
	(ii)	40	1ft	ft from their Venn diagram **[7]**

9 (a)	2410 (2411 to 2414)	2	**M1** for $\pi \times 8^2 \times 12$
(b)	804 (803.8 to 804.4)	3	**M1** for $\pi \times 8^2$ (200.9 to 201.1) **M1** for $\pi \times 16 \times 12$ oe (602.8 to 603.3)
(c)	2.5 www 3	3	**M1** for $500 = \pi \times 8^2 \times h$ or better or $\dfrac{x}{500} = \dfrac{12}{\text{their (a)}}$ oe **A1** for 2.486 to 2.488 or 2.49
(d)	4	2	**M1** for scale factor $\sqrt[3]{\dfrac{1}{8}}$ oe **[10]**
10 (a)	29 www 2	2	**M1** for 18 or 47 seen
(b)	Frequency 4, 5, 10, 5, 6 Frequency density 1, 0.5, 0.5, 0.3	2 2ft	**B1** for at least 3 correct ft from their frequency values **B1** for at least 2 correct ft
(c)	Correct histogram	3ft	**B1** for correct widths with vertical lines consistently placed from 9 to 10, 14 to 15 etc. **B2** for their heights ft dep on 5 columns **B1** for 3 or 4 heights ft dep on 5 cols **[9]**
11 (a)	$\dfrac{1}{4}$ (0.25, 25%)	1	
(b)	$\dfrac{1}{6}$ oe (0.167, 16.7%) www 2	2	**M1** for $\dfrac{2}{4} \times \dfrac{1}{3}$ oe
(c)	$\dfrac{1}{4}$ oe (0.25, 25%) www 3	3	**M2** for $\dfrac{3}{4} \times \dfrac{1}{3}$ oe or **M1** for $\dfrac{a}{b} \times \dfrac{1}{3}$
(d)	$\dfrac{1}{12}$ oe (0.0833…, 8.33…%) www 2	2	**M1** for $\dfrac{1}{4} \times \dfrac{1}{3}$ oe **[8]**

12 (a)	Correct quadrilateral drawn	1	
(b) (i)	Correct reflection	1ft	ft their **(a)**
(ii)	Correct translation	2ft	**SC1** for any other translation $\begin{pmatrix} 2 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ -3 \end{pmatrix}$
(iii)	Correct enlargement	3ft	**SC2** for other enlargement scale factor $\frac{1}{2}$ with correct orientation **or SC1** for any other enlargement centre $(0,0)$ **[7]**
13 (a)	$\frac{x}{360} \times \pi \times 10^2$ or better	2	**M1** for $\frac{x}{360}$ used **SC1** for $\frac{360-x}{360} \times \pi \times 10^2$ or better
(b)	$0.5 \times 10 \times 10 \times \sin x$ or better	2	**M1** for expression from more complicated method
(c)	$\frac{x}{360} \times \pi \times 10^2 - 0.5 \times 10 \times 10 \times \sin x$	1ft	Both expressions must have 10 (not just r) for the radius
(d)	their (b) = 25 $\sin x = \frac{1}{2}$ oe $x = 180 - 30$ oe	M1 A1 E1	ft**M1** for equating their area of triangle to 25 **SC2** for $0.5 \times 10 \times 10 \sin150$ (or $50\sin150$) $= 50 \times 0.5 = 25$
(e)	106 (105.8 – 105.9….)	2ft	ft from their **(c)** (or their **(a)** – **(b)**) if working seen. Could re-start. ft only if answer positive **M1** ft for 150 substituted in their **(c)** (or their **(a)** – **(b)** or re-start) **[17]**
14 (a)	Sketch drawn	1	Allow freehand
(b)	3.4(0) (3.402 − 3.403) www 4	4	**M3** for $r = \frac{2}{\sin 36}$ or $\frac{4\sin 54}{\sin 72}$ or $\sqrt{\frac{8}{1-\cos 72}}$ oe i.e explicit expression **or M2** for correct implicit expression **If M0, B1** for 72, 36, 54 or 108 seen in correct position **[5]**