UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2010 question paper for the guidance of teachers

0607 CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/04 Paper 4 (Extended), maximum raw mark 120

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1	**(a)**	5h 21 min seen 5.35 h seen 340 ÷ 5.35 seen 63.551… or $63\frac{59}{107}$	M1 M1 M1 B1 [4]	Subtracting times (321 M1) Converting minutes part to hours (may be later) (340 ÷ 321 M1) 340 ÷ their time (× 60 M1)
	(b) **(i)**	54.0 (54.01 – 54.02)	B2 [2]	If B0, M1 for 0.85 × 63.55 oe
	(ii)	19 18 ft	B3 **ft** [3]	ft 340 ÷ their **(i)** changed to hours and minutes added to 13 00 If B0, M1 for 340 ÷ their **(i)** (6.29…) or 5.35 ÷ 0.85 or 321 ÷ 0.85 ÷ 60 M1 (dep) for changing decimal part to minutes **[9]**
2	**(a)** **(i)**	93 312	B1 [1]	Accept 93 300 or 93 310
	(ii)	9.3312×10^4 ft	B1 **ft** [1]	ft their **(i)** B1 for 9.331, 9.33 or 9.3 all $\times 10^4$
	(b)	9.69(0) to 9.691×10^{-3}	B2 [2]	B1 for 0.00969(0) to 0.009691 implied by 9.69^{-03} SC1 for 9.7×10^{-3} or 9.69×10^3
	(c)	4.57 or 4.573….	B1 [1]	
	(d)	4.72 or 4.722 to 4.723	B2 [2]	If B0, M1 for log2000 ÷ log5 or graph clearly sketched showing intersection **[7]**
3	**(a)**	Sketch of U-shaped parabola intersecting x-axis twice or full correct use of formula with $a = 1$, $b = 2$ and $c = -4$ $\left(\frac{-2 \pm \sqrt{20}}{2}\right)$ or correct use of completing the square –3.24, 1.24	M1 A1 A1 [3]	If M1 A0, SC1 for –3.2 or – 3.236… **and** 1.2 or 1.236… If M0, SC2 for – 3.24 **and** 1.24 or SC1 for –3.2 or – 3.236… **and** 1.2 or 1.236…
	(b)	$-3.24 \leq x \leq 1.24$ ft	B1 **ft** B1 **ft** [2]	ft only if two solutions to part **(a)** Condone < used and allow in words, if clear **[5]**
4	**(a)**	Line joining 5 on each axis approx Horizontal line roughly through 1 Line through origin at more than 45° to x-axis	B1 B1 B1 [3]	All may be freehand
	(b)	R in correct region oe	B1dep [1]	dep on B3 **[4]**

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5	**(a)**	5 2 3 2.875 (allow 2.87, 2.88 or 2.9) 4	B1 B1 B1 B1 B1 [5]	
	(b)	2	B2 [2]	If B0, M1 for attempting to find a fraction with denominator 72
	(c) **(i)**	$\frac{1}{8}$ cao	B2 [2]	If B0, B1 for $\frac{9}{72}$ o.e.
	(ii)	45 ft	B1**ft** [1]	ft their **(i)** if answer is integer accept $\frac{45}{360}$ **[10]**
6	**(a)**	1.15	B3 [3]	If B0, M1 for $20t + 8(3t - 1)$ and M1 (dep) for this equal to 42.6
	(b) **(i)**	$\frac{15}{y} + \frac{9}{y+2} = 8$	M2	Allow M1 for l.h.s.
		$15(y+2) + 9y = 8y(y+2)$ or $15y + 30 + 9y = 8y^2 + 16y$	M1	Could still be all over $y(y+2)$ and not expanded or partly or fully expanded
		$8y^2 - 8y - 30 = 0$ $\therefore 4y^2 - 4y - 15 = 0$	E1 [4]	Correctly established. Need to see 1 correct line and final answer
	(ii)	$(2y - 5)(2y + 3)$	B2 [2]	Allow SC1 for any other $(2y \pm 5)(2y \pm 3)$
	(iii)	2.5(0) ft	B1**ft** [1]	ft a positive root from **(ii)** if the only one from two possible roots. **[10]**
7	**(a)**	Real numbers oe	B1 [1]	
	(b)	3, 90	B1 B1 [2]	Allow either way round
	(c) **(i)**	Stretch Factor 2 x-axis invariant	B1 B1 B1 [3]	Independent
	(ii)	Translation $\begin{pmatrix} -60 \\ 0 \end{pmatrix}$	B1 B1 [2]	**Must** be translation Independent – Allow description in words **[8]**
8	**(a)** **(i)**	Triangle at (–4, 4), (–1, 4), (–1, 5)	B2 [2]	If B0, SC1 for any translation
	(ii)	Triangle at (–1, –2), (–1, –5), (–2, –5)	B2 [2]	If B0, SC1 if two vertices correct
	(b)	Enlargement , (factor) 2, (centre) (4, 0)	B1 B1 B1 [3]	Each B is independent
	(c)	Translation $\begin{pmatrix} 6 \\ -3 \end{pmatrix}$	B1 B1 [2]	B's independent **Must** be translation but allow description in words **[9]**

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9	**(a)**	2, 3, 5, 7, 11, 13, 17, 19	B1 [1]	
	(b)	All 8 points correctly placed	B3 [3]	B2 for 7 correct and B1 for 6 correct isw extras
	(c)	3, 11, 17, 19 ft	B1 **ft** [1]	ft their Venn diagram
	(d)	3 ft	B1 **ft** [1]	ft their Venn diagram
	(e)	*B* only shaded (i.e. parts in *A* and *C* not shaded)	B1 [1]	**[7]**
10	**(a)** **(i)**	One pair of angles equal with reason Second pair of angles equal with reason Angles of triangles equal	R1 R1 R1 [3]	Reasons can only be angles in same segment oe and vertically opposite oe, the second only used once Accept anything suggesting angles same Each R is independent
	(ii)	18	B2 [2]	If B0, M1 for 2^2 or 0.5^2 seen
	(b) **(i)**	50	B1 [1]	
	(ii)	98	B2 [2]	If B0, M1 for 180 – (32 + their **(i)**) or for angle QPR = 32 seen or for angle PQY = 58 seen (may be on diagram)
	(iii)	5.14 (2…)	B2 [2]	If B0, M1 for cos50 = $RY \div 8$ oe
	(iv)	4	B1 [1]	**[11]**
11	**(a)**	3 points correct 2mm accuracy	P2 [2]	P1 for 2 correct
	(b)	Negative	B1 [1]	Allow description e.g. cold goes down as hot goes up
	(c) **(i)**	$y = -0.565x + 58.5$	B1 B1 [2]	Must be in form $mx + c$, allow –0.57 or –0.5652 to –0.5651 for m and 58 or 58.48…. for c
	(ii)	30 or 31 cao	B2 [2]	Must be integer If B0, M1 for using their linear regression equation with $x = 50$ **[7]**
12	**(a)**	0.8333	B3 [3]	SC2 for $\frac{5}{6}$, 0.83, 0.833, 0.8333…. isw if angle given If B0 and SC0, M1 for $\frac{\sin C}{10} = \frac{\sin 30}{6}$ oe (can be implicit)
	(b) **(i)**	Two accurate points marked C_1 and C_2	B1 B1 [2]	2 mm accuracy
	(ii)	56.4, 123.6	B1 B1 [2]	
	(iii)	67.2 ft	B1**ft** [1]	ft the difference between their answers in **(ii)** **[8]**

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13	**(a)**	982 (981.7 – 981.9)	B2 [2]	If B0, M1 for $0.5 \times \pi \times 25^2$
	(b)	295 000 (294 500 – 294 600) ft	B2 **ft** [2]	ft their **(a)** × 300 If B0, M1 for their **(a)** × 300
	(c) **(i)**	106.3 (106.2 – 106.3)	B3 [3]	Allow 106 If B0, M1 for cos = $\frac{15}{25}$ oe then M1 dep for × 2
	(ii)	299.9 to 300.4 ft	B2 **ft** [2]	ft their **(i)** If B0, M1 for $0.5 \times 25^2 \times \sin(\text{their}\mathbf{(i)})$ or for $0.5 \times 2 \times 20 \times 15$ oe
	(iii)	577.8 to 580 ft	B2 **ft** [2]	ft their **(i)** If B0, M1 for their **(i)** ÷ $360 \times \pi \times 25^2$
	(iv)	277 – 280.1 ft	B1**ft** [1]	ft their **(iii)** – their **(ii)**
	(v)	83.1 to 84.03 ft	B2 **ft** [2]	ft their **(ii)** × 0.3 oe If B0, M1 for their **(ii)** × 0.3 oe **[14]**
14	**(a)**	One curve reasonable shape, roughly approaching $y = 1$ both ends One max in negative x region One minimum just to right of y-axis or on it	B1 B1 B1 [3]	
	(b)	(–5.19, 1.24) (–5.193 to –5.192, 1.238 to 1.239)	B2 [2]	Allow –5.2 and 1.2
	(c)	0.161 to 1.24 (0.1614 to 0.1615 and 1.238 to 1.239)	B3 [3]	Allow 0.16 and 1.24 If B0, B1 for top value their y-coord of **(b)** and M1 (indep) for evidence of finding minimum point
	(d)	$y = 1$	B1 [1]	
	(e)	–1.62(4…)	B2 [2]	If B0, M1 for line with $c = 1$ and positive gradient added to sketch (may be freehand) **[11]**

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