UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2011 question paper for the guidance of teachers

0580 MATHEMATICS

0580/32 Paper 3 (Core), maximum raw mark 104

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UNIVERSITY of CAMBRIDGE
International Examinations

Abbreviations

cao correct answer only
cso correct solution only
dep dependent
ft follow through after error
isw ignore subsequent working
oe or equivalent
SC Special Case
www without wrong working

Qu.	Answers	Mark	Part Marks
1	**(a) (i)** 15 35	**1**	Accept 3.35 **pm** Condone 1535 pm
	(ii) (0)4 20 **pm** cao	**1**	
	(b) (i) 16(.00)	**1**	
	(ii) 96(.00)	**2**	**M1** for 2 × 24 + 3 × their **(b)(i)** seen or implied
2	**(a)** 52.2(%) or 52.17…	**1**	
	(b) 11000 – (32 ÷ 100 × 11000) or (68 ÷ 100 × 11000)	**M1**	
	(=) 7480	**E1**	Must see this for the second mark.
	(c) 8293 or 8290 or 8293.2 or 8293.21 as final answer	**3**	Either **M1** for 7480×1.035^2 oe or **M1** for 7480 × 1.035 = 7741.8 and their 7741.8 × 1.035 (**M1** implied by 8012.76...) Then **M1** dep for completion of method for the third year If zero **SC1** for answer 813.(2…)
	(d) (i) 4 400	**1**	
	(ii) 4 950	**1**	
	(iii) 1 650	**1ft**	11 000 – their **(d)(i)** – their **(d)(ii)**
	(e) 8 : 9 : 3 cao	**2**	**B1** for 40 : 45 : 15 oe seen or correct non-integer ratio

3	**(a)** **(i)** $(\mathbf{r} =)\begin{pmatrix}-2\\-4\end{pmatrix}$	**1**	
	(ii) (1, –2)	**1ft**	(3 + their –2, 2 + their –4)
	(iii) $\begin{pmatrix}2\\4\end{pmatrix}$	**1ft**	Inverse of their **(a)(i)**
	(b) **(i)** Enlargement	**1**	All independent
	(Scale Factor) 3	**1**	
	(Centre) (0, 0)	**1**	
	(ii) Reflection in $x = 0$ drawn	**2**	**SC1** Reflection in $y = 0$
	(iii) Rotation 180° about (0, 0) drawn	**2**	**SC1** 180° rotation about any other point
	(iv) Reflection x axis or $y = 0$	**1ft** **1ft**	**Strict follow through** Independent marks
4	**(a)** $11x - 2y$ final answer	**2**	**B1** for $6x + 3y$ or $5x - 5y$ or $11x$ or $-2y$ in working
	(b) $3x^3 - 2x^2y$ final answer	**2**	**B1** for $3x^3 \pm jx^2y$ or $kx^3 - 2x^2y$
	(c) $2y(2y - 5x)$ final answer	**2**	**B1** for $y(4y - 10x)$ or $2(2y^2 - 5xy)$ or **SC1** for $2y(2y + 5x)$ or **SC1** for $2y(2y - 5x)$ in working but then spoilt
	(d) **(i)** 12	**2**	**M1** for $\frac{4\times(-3)^2}{3}$ or better in working.
	(ii) $(x) = \sqrt{\frac{3y}{4}}$ final answer oe	**3**	**Maximum of M2 from** **M1** for × by 3 **M1** for ÷ by 4 **M1** for square root
5	**(a)** 56.6 or 56.56…	**2**	**M1** for $\tan 22 = \frac{h}{140}$ or better or **M1** for $\tan(90–22) = \frac{140}{h}$ or better
	(b) 529 (km/h) or 528.6 or 528.57…	**2**	**M1** for $\frac{(1850)}{3.5}$ or better.
	(c) **(i)** 3700(m)	**1**	
	(ii) 14.3 or 14.2(8…)	**2ft**	**M1** for $\sin(BAC) = \frac{\text{their (c)(i)}}{15000}$

6	**(a) (i)** 240	**2**	**M1** for $0.5 \times 30 \times 16$
	(ii) 5760	**1ft**	ft is **(a)(i)** $\times$ 24
	(b) (i) 34	**2**	**M1** for $(FB^2) = 16^2 + 30^2$
	(ii) 6	**3**	**M1** for (circumference) $= 1.6 \times \pi$ **M1** dep their **(b)(i)** $\div$ their 1.6π (6.76 implies **M1**, **M1**) If 0 scored either **SC1** for their **(b)(i)** $\div 3.2 \times \pi$ and then **SC1** for truncating correctly If **M1** or still 0 scored then **SC1** for truncating correctly any number with at least 1 decimal place
	(c) 6 by 4 rectangle above	**1**	
	6 by their 8.5 rectangle below	**1ft**	ft **(b)(i)** $\div$ 4
	Correct triangle on AB	**1**	
	(d) 2400	**3cao**	**M2** for $\frac{1}{2} \times 30 \times 16 + \frac{1}{2} \times 30 \times 16 + 16 \times 24 +$ 30×24 + their 34×24 (**M1** for any 3 areas) If 0, **SC2** for 150 or **SC1** for 120 (3 rectangles) or **SC1** for 30 (2 triangles)
7	**(a) (i)** $-3, -6, 9, 6, 2$	**2**	**B1** for 4 correct
	(ii) Graph	**P3ft**	**P2ft** for 8 or 9 points correct **P1ft** for 6 or 7 points correct
		C1	Correct curve and not crossing axis
	(iii) -3.7 to -3.5	**1ft**	ft their curve
	(b) (i) $-3, 9$	**1, 1**	
	(ii) Ruled continuous line $y = 2x + 3$	**1**	Line long enough to intersect both parts
	(iii) (2.2 to 2.5, 7.5 to 7.8)	**1ft**	ft their line intersection with the curves
	(-4.0 to -3.7, -4.8 to -4.5)	**1ft**	
8	**(a)** heights 11, 13, 15, 16	**2**	**B1** for 3 correct
	(b) (i) 84.8(3…)	**2**	**M1** addition of 12 rainfall values
	(ii) 81.5	**2**	Either **M1** for evidence of ordering values or substantial part of list (at least first 7 or last 7) or **M1** for answers of 81 **and** 82
	(c) (i) 8 values correctly plotted	**P3**	**P2** for 6 or 7 correct **P1** for 4 or 5 correct
	(ii) Line of best fit	**1**	Must be continuous and straight
	(iii) Negative	**1**	

9	**(a)** Bisector of angle *BAC* with correct arcs	**2**	Either **B1** correct without arcs or **B1** for 2 pairs of accurate arcs seen
	(b) **(i)** Bisector of *BC* with 2 pairs of correct arcs	**2**	Either **B1** correct without arcs or **B1** for 2 pairs of accurate arcs seen
	(ii) 10.8 to 11.2 (cm) cao	**1**	
	(iii) 32.4 to 33.6	**1ft**	Their **(b)(ii)** × 3
	(iv) 155° to 165° cao	**1**	
	(c) **(i)** Circle centre *L*, radius 3cm	**2**	**B1** circle centre *L*, incorrect radius or **SC1** for part circle with correct radius
	(ii) 41km to 44km cao	**1**	
10	**(a)** **(i)** 30	**1**	
	(ii) 43	**1**	
	(iii) 20	**1**	
	(iv) $\frac{1}{8}$ or 0.125	**1**	
	(v) 32	**1**	
	(a) **(i)** 65	**1**	
	(ii) $7n - 5$ or equivalent	**2**	**B1** for $7n$ seen
	(c) 1325	**2**	**B1** for $\frac{50^2 + 3\times 50}{2}$ or better seen
	(d) 4096	**1**	