

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

0580 MATHEMATICS

0580/31

Paper 3 (Core), maximum raw mark 104

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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
art	anything rounding to
soi	seen or implied

Qu.	Answers	Mark	Part Marks
1	(a) (i) 84 cao	1	
	(ii) 31 or 37 cao	1	
	(iii) 121 cao	1	
	(iv) 125 cao	1	
	(b) $55\% < \frac{5}{9} < \sqrt{0.31}$ oe for each term	2	
2	(a) 90° (Angle between) tangent and radius/ diameter	1 1 dep	M1 for using isosceles triangle POR or M1 for using isosceles triangle ROS then triangle PRS
	(b) (i) 54° cao	1	
	(ii) $\frac{1}{2} \times (180 - 54)$ or $180 - 90 - \frac{1}{2}(180 - 126)$ or 54/2 followed by (180 - 90 - 27 oe)	2	
	(c) (i) 90° cao	1	
	(ii) 27° cao	1	
3	(a) (i) 63	2	M1 for their “378” ÷ 6 or SC1 for 333 seen
	(ii) 38 cao	1	
	(b) (i) 1.5 cao	1	B1 for attempt to order the numbers
	(ii) 4	2	
	(c) 80°	2	M1 for $84 \div \text{their total} \times 360$
	(d) (i) 1 hour	1	Condone size, shape of suns
	(ii) 4 and a half more suns drawn	1	
	(e) (i) 4 correct plots	2	B1 for 3 or 2 correct
	(ii) Positive	1	

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4	(a) 42	1	
	(b) (i) 60°	1	
	(ii) 6.06(217...)	2	M1 ft for $\frac{x}{7} = \cos 30$ or $\frac{x}{7} = \sin 60$ or $\frac{x}{3.5} = \tan 60$ or $\frac{3.5}{x} = \tan 30$ or better
	(c) (i) 21.2 to 21.4 ft (ii) 91.4 to 91.7 ft	2ft 2ft	M1 for $\frac{1}{2} \times 7 \times$ their (b)(ii) oe M1 ft $7 \times 7 + 2$ (their (c)(i)) or B1 for 49
5	(a) 36 (%)	3	M2 for $\frac{5.1 - 3.75}{3.75} \times 100$ M1 for $\frac{5.1}{3.75}$ or 136% or 1.36 or 5.1 – 3.75 implied by 1.35
	(b) 400	2	M1 for $2.04 \div 5.1$ implied by figs 4
	(c) (i) 1.53	2	M1 for $(1 - 0.7) \times 5.1$ oe or $5.10 - (5.10 \times 0.70)$
	(ii) 40.29 cao	2	M1 for $7 \times 5.1 + 3 \times$ their (c)(i) or $35.7 + (3 \times$ their (c)(i) evaluated)
6	(a) -1, -4, 1.3, 1	2	B1 for -1 and 1 and B1 for -4 and 1.3
	(b) 10 points plotted $\frac{1}{2}$ small square accuracy smooth correct curves not across y-axis	P3ft C1	P2 for 8 or 9 points, P1 for 5 or 6 or 7 points
	(c) -1.6 correct or ft	1ft	ft from their graph
	(d) (i) $y = 5$ drawn (ii) $(x =)$ 0.8 correct or ft	1 1ft	ft from their graph
	(e) (i) Ruled line drawn from (-0.5, -8) to (2, 2) (ii) 4 cao (iii) $y = 4x - 6$ or $y =$ their (e)(ii) $x +$ their intercept or $y = 4x +$ their intercept	2 1 2ft	B1 for ruled line drawn from either point not horizontal or vertical B1 ft $y = 4x + k$ or $y =$ their (e)(ii) $x + k$ or $y = jx - 6$ or $y = jx +$ their intercept
7	(a) 0.5 or $\frac{1}{2}$	2	M1 for collecting terms correctly
	(b) $6x - 34y$ or $2(3x - 17y)$	2	B1 for $21x - 28y$ or B1 for $-15x - 6y$ or B1 for $6x$ or B1 for $-34y$
	(c) $3g^2(2 - g)$ cao	2	B1 for correct partial factorising

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8	(a) (i) Rotated 180° about origin	2	B1 for correct shape and orientation in wrong position
	(ii) Reflected in $y = 3$	2	B1 for reflection in $x = 3$ or $y = k$
	(iii) Translated by $\begin{pmatrix} -5 \\ 3 \end{pmatrix}$	2	B1 for translation by $\begin{pmatrix} -5 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ 3 \end{pmatrix}$ or $\begin{pmatrix} 3 \\ -5 \end{pmatrix}$
	(b) (i) Reflection $x = -1$	1	B1 for each Independent Independent
	(ii) Enlargement only (sf) 3 (centre) (1, 3)	1	
9	(a) 248 art	3	M2 for $\sqrt{325^2 - 210^2}$ or better M1 for $325^2 = x^2 + 210^2$ or better
	(b) (i) 40.3° art	2	M1 $\sin = 210 \div 325$ or $\cos = \frac{\text{their (a)}}{325}$ or $\tan = \frac{210}{\text{their (a)}}$
	(ii) 319.7(5)° or 320°	2ft	M1 for 360 – their (b)(i)
	(c) (i) 28	2	B1 for (time $\Rightarrow$) 7.5 or 7.30 or M1 for $210 \div \text{their 7.5}$
	(ii) 8h 47min	3	M1 for $325 \div 37$ A1 for 8.78(37...) B1 independent converting decimal time to minutes
	(iii) 22 47 or 10 47 pm	1ft	ft 1400 + their (c)(ii)
10	(a) 5 by 5 shape	1	Independent All three Independent
	(b) First row 25 2500 n^2	1, 1, 1	
	Second row 1 1 1	1	
	Third row 24 2499 $n^2 - 1$	1, 1, 1	
11	(c) 100	1	B1 mark for a correct step
	(a) 8	1	
	(b) (i) 355	2	
	(ii) 33	3	
11	(c) $t = \frac{p-k}{8}$	2	B1 mark for a correct step