

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

0581 MATHEMATICS

0581/31

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

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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	2ft	M1 for $\frac{1}{2} \times 7 \times$ their (b)(ii) oe	
	(ii) 91.4 to 91.7 ft	2ft	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	P2 for 8 or 9 points, P1 for 5 or 6 or 7 points
		C1	
	(c) -1.6 correct or ft	1ft	ft from their graph
	(d) (i) $y = 5$ drawn	1	
		(ii) $(x =)$ 0.8 correct or ft	1ft
(e) (i) Ruled line drawn from (-0.5, -8) to (2, 2)	2	B1 for ruled line drawn from either point not horizontal or vertical	
	(ii) 4 cao	1	
	(iii) $y = 4x - 6$ or $y =$ their (e)(ii) $x +$ their intercept or $y = 4x +$ their intercept	2ft	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 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 1	
	(ii) Enlargement only (sf) 3 (centre) (1, 3)	1 1 1	B1 for each Independent Independent
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 $360 - \text{their (b)(i)}$
	(c) (i) 28	2	B1 for (time =) 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	
	(b) First row 25 2500 n^2 Second row 1 1 1 Third row 24 2499 $n^2 - 1$	1, 1, 1 1 1, 1, 1	Independent All three Independent
	(c) 100	1	
11	(a) 8	1	
	(b) (i) 355	2	M1 for $8 \times 40 + 35$ seen or better
	(ii) 33	3	M2 for $\frac{(288 - 24)}{8}$ or B1 for 264 seen
	(c) $t = \frac{p-k}{8}$	2	B1 mark for a correct step