

**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

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

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

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4	(a) 42	1	
	(b) (i) $60^\circ$	1	
	(ii) 6.06(217...)	2	<b>M1</b> 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	<b>M1</b> for $\frac{1}{2} \times 7 \times$ their (b)(ii) oe <b>M1</b> ft $7 \times 7 + 2$ (their (c)(i)) or <b>B1</b> for 49
5	(a) 36 (%)	3	<b>M2</b> for $\frac{5.1 - 3.75}{3.75} \times 100$ <b>M1</b> for $\frac{5.1}{3.75}$ or 136% or 1.36 or 5.1 – 3.75 implied by 1.35
	(b) 400	2	<b>M1</b> for $2.04 \div 5.1$ implied by figs 4
	(c) (i) 1.53	2	<b>M1</b> for $(1 - 0.7) \times 5.1$ oe or $5.10 - (5.10 \times 0.70)$
	(ii) 40.29 cao	2	<b>M1</b> 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	<b>B1</b> for -1 and 1 and <b>B1</b> for -4 and 1.3
	(b) 10 points plotted $\frac{1}{2}$ small square accuracy smooth correct curves not across y-axis	P3ft C1	<b>P2</b> for 8 or 9 points, <b>P1</b> 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	<b>B1</b> for ruled line drawn from either point not horizontal or vertical <b>B1</b> 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	<b>M1</b> for collecting terms correctly
	(b) $6x - 34y$ or $2(3x - 17y)$	2	<b>B1</b> for $21x - 28y$ or <b>B1</b> for $-15x - 6y$ or <b>B1</b> for $6x$ or <b>B1</b> for $-34y$
	(c) $3g^2(2 - g)$ cao	2	<b>B1</b> for correct partial factorising

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8	(a) (i) Rotated 180° about origin	2	<b>B1</b> for correct shape and orientation in wrong position
	(ii) Reflected in $y = 3$	2	<b>B1</b> for reflection in $x = 3$ or $y = k$
	(iii) Translated by $\begin{pmatrix} -5 \\ 3 \end{pmatrix}$	2	<b>B1</b> 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	<b>B1</b> for each Independent Independent
	(ii) Enlargement only (sf) 3 (centre) (1, 3)	1	
9	(a) 248 art	3	<b>M2</b> for $\sqrt{325^2 - 210^2}$ or better <b>M1</b> for $325^2 = x^2 + 210^2$ or better
	(b) (i) 40.3° art	2	<b>M1</b> $\sin = 210 \div 325$ or $\cos = \frac{\text{their (a)}}{325}$ or $\tan = \frac{210}{\text{their (a)}}$
	(ii) 319.7(5)° or 320°	2ft	<b>M1</b> for 360 – their (b)(i)
	(c) (i) 28	2	<b>B1</b> for (time $\Rightarrow$ ) 7.5 or 7.30 or <b>M1</b> for $210 \div \text{their 7.5}$
	(ii) 8h 47min	3	<b>M1</b> for $325 \div 37$ <b>A1</b> for 8.78(37...) <b>B1</b> 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	<b>B1</b> mark for a correct step
	(a) 8	1	
	(b) (i) 355	2	
	(ii) 33	3	
11	(c) $t = \frac{p-k}{8}$	2	<b>M2</b> for $\frac{(288-24)}{8}$ or <b>B1</b> for 264 seen