

**MARK SCHEME for the October/November 2012 series**

**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.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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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

Qu.	Answers	Mark	Part Marks	
<b>1</b>	<b>(a) (i)</b> Any two multiples of 10	<b>1</b>	<b>B1</b> for any other common multiple of 10 and 15 ie $30k$	
	<b>(ii)</b> 30	<b>2</b>		
	<b>(b) (i)</b> 6 or 9 or 6 and 9 cao	<b>1</b>		
	<b>(ii)</b> 27 cao	<b>1</b>		
	<b>(iii)</b> 23 cao	<b>1</b>		
	<b>(c) (i)</b> Example of odd square number	<b>1</b>		
	<b>(ii)</b> Example of odd sum of primes	<b>1</b>		
	<b>(d)</b> $4^{-2}$ , $8^0$ , $\sqrt{169}$ , $2^5$	<b>2</b>		<b>B1</b> for only 1 out of order or for three seen correctly evaluated
<b>2</b>	<b>(a) (i)</b> 12.5(0)	<b>1</b>	<b>B1</b> for $\frac{175}{475}$ oe seen	
	<b>(ii)</b> $\frac{7}{19}$	<b>2</b>		
	<b>(iii)</b> 133.75	<b>2</b>		<b>M1</b> for $\frac{7}{20} \times 475$
	<b>(b)</b> 503.5(0)	<b>2</b>		<b>M1</b> for $106 \div 100 \times 475$ Or $475 + (6 \div 100 \times 475)$
	<b>(c)</b> 28.56	<b>3</b>		<b>M1</b> for $350 \times 1.04^2$ oe dep <b>M1</b> for 'their 378.56' – 350 <b>Or M1</b> for $(350 \times 0.04)$ (imp by 14) <b>and</b> $(350 + \text{'their 14'}) \times 0.04$ (imp by 14.56) dep <b>M1</b> 'their 14' + 'their 14.56'

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3	<p>(a) (i) 0</p> <p>(ii) 1</p> <p>(iii) 1.6</p> <p>(iv) Bar chart with  – horizontal axis correctly labelled  – and vertical axis correctly scaled  – and bars of correct height and equal width,  – and with equal gaps or no gaps</p> <p>(b) (i) <math>\frac{5}{15}</math> or <math>\frac{1}{3}</math></p> <p>(ii) <math>\frac{11}{15}</math></p> <p>(iii) <math>\frac{6}{15}</math> or <math>\frac{2}{5}</math></p>	<p>1</p> <p>1</p> <p>3</p> <p>4</p> <p>1</p> <p>1</p> <p>1</p>	<p><b>M1</b> for <math>(0 \times 6) + 1 \times 2 + 2 \times 3 + 3 \times 1 + 4 \times 2 + 5 \times 1</math> or better  <b>dep M1</b> for ‘their 24’ <math>\div 15</math></p> <p><b>B1</b> for horizontal axis labelled correctly  <b>B1</b> for linear vertical scale to at least 5  <b>B2</b> for all bars correct height and equal width with equal or no gaps  Or <b>B1</b> for unequal widths or at least four bars correct height and equal width</p>
4	<p>(a) (i) <math>70^\circ</math></p> <p>(ii) isosceles</p> <p>(iii) <math>40^\circ</math>  Corresponding (to angle <i>CBD</i>)</p> <p>(iv) similar</p> <p>(b) (i) <math>305^\circ</math></p> <p>(ii) (Angle between) tangent (and) radius</p> <p>(iii) <math>125^\circ</math> or <math>235^\circ</math></p> <p>(iv) kite</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>dep on <math>40^\circ</math> (accept longer reasons)</p>

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5	(a) $(CD^2 =) (32 - 20)^2 + 15^2$ oe $(CD =) \sqrt{369} = 19.20$ to $19.21$	M1 A1	A0 for 19.2 alone.
	(b) 3017	2	M1 for $20 + 15 + 32 + 19.2(1)$ [implied by 86.2(1)] Or M1 for $(20 \times 35) + (15 \times 35) + (32 \times 35) + (19.2(1) \times 35)$
	(c) 390	2	M1 for $(20 + 32) \times 15 \div 2$ oe
	(d) 273	2ft	M1 for 'their (c)' $\times 7 \div 10$
	(e) (i) trapezium constructed $BC = 5$ cm, $AD = 8$ cm Both $90^\circ$ to $AB$	2	B1 for $C$ or $D$ correctly positioned
	(ii) $49 - 53^\circ$	1ft	
	(iii) $34.4 - 36.4$ m	1ft	
6	(a) 9 16 25 7 10 13	2 2	B1 for 2 correct B1 for 2 correct, or difference of 3 between diagrams 4 and 5
	(b) square	1	
	(c) (i) 22	1	
	(ii) $3n - 2$ oe final answer	2	B1 for $3n \pm j$ seen Or $kn - 2$ , where $k \neq 0$
	(d) (i) 20	2	ft M1 for 'their (c)(ii)' = 58 or better, seen
	(ii) 400	1ft	'their (d)(i)' <sup>2</sup> (must be evaluated)

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7	(a) (i) 140	2	M1 for $80 + 5 \times 12$ or better
	(ii) 30	2	M1 for $(230 - 80) \div 5$ or 150 seen
	(iii) $\frac{C-80}{5}$ or $\frac{C}{5} - 16$ or $\frac{80-C}{-5}$ final answer	2	M1 for $C - 80 = 5n$ Or M1 for $\frac{C}{5} = \frac{80}{5} + \frac{5n}{5}$ or better
	(b) $9x + 2$ final answer	2	M1 for $9x + k$ or $mx + 2$ or $6x + 8$ or $-6 + 3x$ or $9x + 2$ spoilt
(c) $x = 3, y = 4$	3	M1 for correct method to eliminate one variable  A1 $x = 3$ A1 $y = 4$	
8	(a) (i) 165 000	2	M1 for figs 165 or $55 \times 40 \times 75$ seen
	(ii) 165	1ft	'their (a)(i)' $\div 1000$
	(b) (i) 10 minutes 24 seconds	2	M1 for $260 \div 25$ or 10.4 seen or 624 seen
	(ii) 255	1	
(c) 30	2	M1 for $\sqrt[3]{27000}$	
9	(a) $y$ -values $-2, 4, 8, 4, -2$	3	B2 for 3 or 4 correct B1 for 2 correct
	(b) 10 correctly plotted points  Smooth curve through 10 correct points and correct shape.	3ft  1	B2ft for 8 or 9 points B1ft for 6 or 7 points Curve must pass above $y = 10$
	(c) $x = 1.5$ oe	1	
	(d) (i) Line $y = 6$ drawn	1	
	(ii) $x = 3.5$ to $3.7$ $x = -0.7$ to $-0.5$	1ft 1ft	Ft their curve and their line drawn

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<b>10</b>	<p><b>(a) (i)</b> Rotation, 90° anticlockwise oe, (centre) (0, 0), origin, O</p>	<b>3</b>	<b>B1</b> for each
	<p><b>(ii)</b> Enlargement, (scale factor) 2, (centre) (–1, 1)</p>	<b>3</b>	<b>B1</b> for each
	<p><b>(b) (i)</b> correct translation</p>	<b>2</b>	<b>B1</b> for 3 right or 4 down
	<p><b>(ii)</b> correct reflection</p>	<b>2</b>	<b>B1</b> for reflection in any line parallel to $x$ -axis <b>or</b> for correct reflection in $x = -1$