

MARK SCHEME for the October/November 2012 series

0581 MATHEMATICS

0581/31

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

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

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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° to AB (ii) $49 - 53^\circ$ (iii) $34.4 - 36.4$ m	2 1ft 1ft	B1 for C or D correctly positioned
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 (ii) $3n - 2$ oe final answer	1 2	B1 for $3n \pm j$ seen Or $kn - 2$, where $k \neq 0$
	(d) (i) 20 (ii) 400	2 1ft	ft M1 for 'their (c)(ii)' = 58 or better, seen 'their (d)(i)' ² (must be evaluated)

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

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