CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

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.

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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	
	(ii) 30	2	**B1** for any other common multiple of 10 and 15 ie $30k$
	(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	**B1** for only 1 out of order or for three seen correctly evaluated
2	**(a) (i)** 12.5(0)	1	
	(ii) $\frac{7}{19}$	2	**B1** for $\frac{175}{475}$ oe seen
	(iii) 133.75	2	**M1** for $\frac{7}{20} \times 475$
	(b) 503.5(0)	2	**M1** for $106 \div 100 \times 475$ Or $475 + (6 \div 100 \times 475)$
	(c) 28.56	3	**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 + 'their 14') × 0.04 (imp by 14.56) dep **M1** 'their 14' + 'their 14.56'

3	**(a) (i)** 0	**1**	
	(ii) 1	**1**	
	(iii) 1.6	**3**	**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' ÷ 15
	(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**	**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
	(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**	
	(ii) isosceles	**1**	
	(iii) 40°	**1**	
	Corresponding (to angle *CBD*)	**1**	dep on 40° (accept longer reasons)
	(iv) similar	**1**	
	(b) (i) 305°	**1**	
	(ii) (Angle between) tangent (and) radius	**1**	
	(iii) 125° or 235°	**1**	
	(iv) kite	**1**	

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 × 35) + (15 × 35) + (32 × 35) + (19.2(1) × 35)
	(c) 390	**2**	**M1** for (20 + 32) × 15 ÷ 2 oe
	(d) 273	**2ft**	**M1** for 'their **(c)**' × 7 ÷ 10
	(e) **(i)** trapezium constructed $BC = 5$ cm, $AD = 8$ cm Both 90° to AB	**2**	**B1** for C or D correctly positioned
	(ii) 49 – 53°	**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)**'^{2} (must be evaluated)

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)**' ÷ 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	**3ft**	**B2ft** for 8 or 9 points **B1ft** for 6 or 7 points
	Smooth curve through 10 correct points and correct shape.	**1**	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

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 $x = -1$