CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2013 series

0581 MATHEMATICS

0581/22 Paper 2 (Extended), maximum raw mark 70

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.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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
soi seen or implied

Qu.	Answers	Mark	Part Marks
1	19% 0.719^5 $\sqrt{0.038}$ sin 11.4 1/5	2	**B1** for decimals [0.19], [0.2], 0.194…, 0.197…, 0.192… seen Or for four in correct order
2	**(a)** –447 **(b)** 2	1 1	
3	15.7 or 15.70 to 15.71	2	**M1** for $2 \times \pi \times 2.5$
4	160	2	**M1** for $\frac{8}{18} \times 360$ oe
5	**(a)**  **(b)** Some possible answers: 	1 1	
6	$[\pm]\sqrt{y-4}$ final answer	2	**M1** for first move completed correctly **M1** for second move completed correctly on answer line
7	170	2	**M1** for $\frac{1}{2} \times (12+22) \times 10$ oe
8	3619 to 3620	2	**M1** for $\frac{1}{2} \times \frac{4}{3} \times \pi \times 12^3$ or better
9	decagon	3	**M1** for 360 ÷ 36 oe **A1** for 10
10	10.1[0]	3	**M1** for 1.3199 and 1.3401 seen and **M1** for 500 × 1.3199 or 500 × 1.3401 or for 500 × (*their* highest – *their* lowest) oe
11	120	3	**M1** for $v = \frac{k}{\sqrt{d}}$ **A1** for $k = 600$

12	$p = 71.4025$ cao $q = 73.1025$ cao	**3**	**B1** for 8.45 and 8.55 seen **M1** for *their* LB^2 [π] or *their* UB^2 [π] If 0 scored, **SC1** for one correct.
13	10[.00]	**3**	**M2** for 1.90 and 2.90 and 5.20 only or **M1** for two of 1.90, 2.90, 5.20 in a list of three or two values from the table or **SC1** FOR 1.90, 2.90, 4.30 $\left[\text{from } \frac{3.40+5.20}{2}\right]$
14	52	**3**	**B2** for $AOB = 104$ or **B1** for OAB or $OBA = 38$
15	(8, 2)	**3**	**M1** for correctly eliminating one variable **A1** for $x = 8$ **A1** for $y = 2$ If 0 scored, **SC2** for correct substitution and correct evaluation to find the other value.
16	$x < 6.8$	**4**	**B3** for 6.8 with wrong inequality or equal as answer. Or **M1** for first move completed correctly and **M1** for second move completed correctly and **M1** for third move completed correctly
17	**(a)** $\begin{pmatrix} 11 & 5 \\ 26 & 30 \end{pmatrix}$ **(b)** $\frac{1}{8}\begin{pmatrix} 6 & -1 \\ -4 & 2 \end{pmatrix}$ oe	**2** **2**	**SC1** for one correct row or column **B1** for $k\begin{pmatrix} 6 & -1 \\ -4 & 2 \end{pmatrix}$ or **B1** for $\frac{1}{8}\begin{pmatrix} a & b \\ c & d \end{pmatrix}$
18	**(a)** (1.5, 12.5) oe **(b)** $y = 3x + 8$ oe **(c)** Most common methods: Correctly substituting P (3, 17) into $y = 3x + 8$ Showing the gradient of AP or $BP = 3$ Other methods possible.	**2** **3** **1**	**B1** for either coordinate **B2** for $y = mx + 8$ or $y = 3x + c$ or $3x + 8$ or **B1** for gradient (or m) = 3 and **B1** for $c = 8$ If 0 scored, **SC1** for 23 = *their* $m \times 5 + c$ or for 2 = *their* $m \times -2 + c$ or for 12.5 = *their* $m \times 1.5 + c$

19	**(a)** $-2\mathbf{a} - 2\mathbf{c}$ oe	**2**	**M1** for **BO** = $-\mathbf{a} - \mathbf{c}$ or for any correct rou unsimplified expression
	(b) $2\mathbf{a} + \mathbf{c}$	**2**	**M1** for any correct route or correct unsimplified expression
	(c) $-\mathbf{a} - \mathbf{c}$ oe	**2FT**	FT *their* **(a)** or correct answer Or **M1** for a correct non direct route from O to E or for correct unsimplified expression or for correct FT unsimplified
20	**(a)** 4.05 to 4.2	**1**	
	(b) 2.6 to 2.75	**2**	**B1** for 9.6 seen
	(c) 2.05 to 2.25	**2**	**B1** for [UQ] 5.0 to 5.1 and [LQ] 2.85 to 2.95 seen
	(d) $\frac{5}{48}$	**2**	**M1** for 5
21	**(a)** 37.2 or 37.17 to 37.19	**3**	**M2** for $\sin[\ ] = \frac{4 \times \sin 65}{6}$ or **M1** for $\frac{4}{\sin[]} = \frac{6}{\sin 65}$ oe
	(b) 11.7 or 11.72 to 11.74	**3**	**M1** for [B =] 160 – 65 – *their* **(a)** **M1** for $\frac{1}{2} \times 4 \times 6 \times \sin$ *their* 77.8