CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2014 series

0580 MATHEMATICS

0580/23 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.

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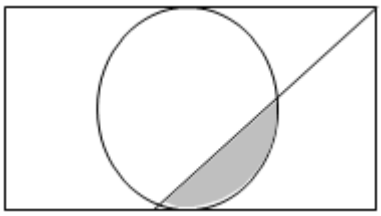
Abbreviations

cao correct answer only
dep dependent
FT follow through after error
isw ignore subsequent working
oe or equivalent
SC Special Case
nfww not from wrong working
soi seen or implied

Qu.	Answers	Mark	Part Marks
1	2870	**2**	**M1** for 350×8.2
2	$0.34 \quad 0.7^3 \quad 0.6^2 \quad \sqrt{0.6}$	**2**	**M1** for decimal conversion: 0.7 [7…] or 0.8 for $\sqrt{0.6}$ and 0.36 for 0.6^2 and 0.343 for 0.7^3 or **B1** for three in the correct order
3	2.4×10^8	**2**	**B1** for 240 000 000 oe or **B1** for $k \times 10^8$ or 2.4×10^k
4	30	**2**	**M1** for $2x + 3x + 4x + 90 = 360$ oe
5	48	**2**	**M1** for $52 \div 65$ [× 60] oe implied by 0.8
6	9.5 or $\frac{19}{2}$	**3**	**M2** for $2x = (8 \times 3) - 5$ or better oe or **M1** for $2x + 5 = 8 \times 3$ or better
7	160	**3**	**M2** for $180 \quad \frac{360}{18}$ or $\frac{180 \times (18 \quad 2)}{18}$ oe or **M1** for $180 \times (18 - 2)$ or $\frac{360}{18}$
8	$8 + (y - 2)^2$ oe final answer	**3**	**M1** for $y - 2 = \sqrt{(x - 8)}$ **M1** for squaring both sides completed correctly **M1** for adding *their* 8 completed correctly on answer line
9	4	**3**	**M2** for $6(3 + 5) = y(7 + 5)$ oe or **M1** for $y \quad \frac{k}{x+5}$ oe **A1** for $k = 48$
10	13891.5[0]	**3**	**M2** for $12000 \times \left(1 + \frac{5}{100}\right)^3$ oe or **M1** for $12000 \times \left(1 + \frac{5}{100}\right)^n$ oe $n \geqslant 2$

11	**(a)**	608 400 cao	**2**	**M1** for $\frac{1}{4} \times 39^2 \times (39+1)^2$
	(b)	$2n^2(n+1)^2$ oe	**1**	
12	**(a)**	Complete circle centre *E* radius 3cm	**1**	
	(b)	Correct ruled bisector with two pairs of correct arcs	**2**	**B1** for correct bisector with no/wrong arcs
	(c)		**1**	dep on attempt at bisector of *C* and enclosed region
13		$\frac{16x^2+18x+9}{6x}$ final answer	**4**	**M2** for 9 [+] $4x^2$ [+] $18x$ [+] $12x^2$ or better or **M1** for 2 of these and **M1FT** for adding their four 'numerators' together correctly and **B1** for denominator $6x$ to a maximum of **3** marks
14	**(a)**	$\frac{1}{2}\mathbf{b}$ $\frac{1}{2}\mathbf{a}$ oe	**2**	**M1** for $\frac{1}{2}(\overrightarrow{AO} + \overrightarrow{OB})$ oe or correct unsimplified route e.g. $\overrightarrow{AO} + \overrightarrow{OB} + \overrightarrow{BP}$ or $-\mathbf{a} + \mathbf{b} + \frac{1}{2}\overrightarrow{BA} = -\mathbf{a} + \mathbf{b} + \frac{1}{2}(\mathbf{a} - \mathbf{b})$
	(b)	$\frac{1}{4}\mathbf{a} + \frac{3}{4}\mathbf{b}$ oe	**2**	**M1** for $\overrightarrow{OA} + \overrightarrow{AQ}$ oe or correct unsimplified route
15	**(a)**	19 2 1 8	**2**	**B1** for any two correct
	(b)	1 8 19 2	**2FT**	**B2FT** for a correct ft from **(a)** or **B1FT** for any two correct or for any correct two ft from **(a)**
16	**(a)**	64	**2**	**B1** for [f(1) =] 4 or **M1** for $((x-3)^2)^3$ or better
	(b)	$4x + 1$ oe	**2**	**M1** for $x \quad \frac{y \quad 1}{4}$ or $4y = x - 1$
	(c)	$\frac{x^3 \quad 1}{4}$ oe final answer	**1**	
	(d)	3 nfww	**1**	

17	**(a)**	3.08 to 3.22 nfww	**2**	**B1** for 502.5 to 502.62 or 505.7 to 505.8
	(b)	$\frac{16}{200}$ oe	**2**	**B1** for 16 soi or **M1** for $\frac{\textit{their}16}{200}$
	(c)	18.5 26 3	**2**	**B1** for 18.5 and 26 **B1** for 3
18	**(a)**	3	**4**	**B3** for 3.536 to 3.54 as an answer or **M2** for $2000 \div \frac{1}{3}\pi \times 6^2 \times 15$ or **M1** for $\frac{1}{3}\pi \times 6^2 \times 15$ and **SC1** for truncating *their* 3.54 to a whole number
	(b)	303 to 304	**3**	**M2** for 2000 – *their* 3 × *their* volume or **M1** for *their* 3 × *their* volume
19	**(a)**	rotation 90 clockwise [about] origin oe	**3**	**B1** for each
	(b)	$\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$	**2**	**M1** for any one column or row correct
	(c)	Triangle at (3, 3), (6, 3) and (3, 5)	**2**	**M1** for any two vertices correct or correct answer translated horizontally