

**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

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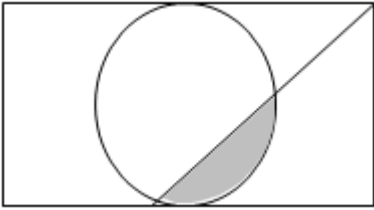
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### Abbreviations

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

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

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