CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0580 MATHEMATICS

0580/22   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.

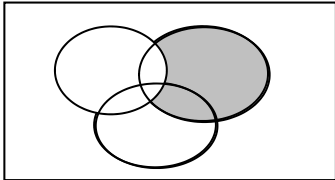Cambridge will not enter into discussions about these mark schemes.

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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

Question	Answer	Mark	Part Marks
1	17	**1**	
2	Parallelogram	**1**	
3	694 or 694.4[4...]	**2**	**M1** for $950 \div 1.368$
4	5.83 or 5.830 to 5.831	**2**	**M1** for $\sqrt{(-3)^2 + 5^2}$
5	262 or 261.7 to 261.83…	**2**	**M1** for $\frac{1}{2} \times \frac{4}{3}\pi \times 5^3$ If zero scored **SC1** for final answer 524 or 523.5 to 523.7
6 (a)	18	**1**	
(b)		**1**	
7	$\begin{pmatrix} 11 & -8 \\ -6 & 8 \end{pmatrix}$	**2**	**B1** for two correct elements
8	3826 or 3826.38	**2**	**M1** for $8000 \times \left(1-\frac{10}{100}\right)^7$ oe
9	0.3	**2**	**M1** for $\frac{k \times 50\,000 \times 50\,000}{100\,000 \times 100\,000}$ oe If zero scored **SC1** for figs 3
10	54	**3**	**M2** for $14.4 \times \frac{15}{4}$ oe or **M1** for $14.4 \div 4$ or $\frac{4}{15}$ associated with 14.4 If zero scored **SC1** for final answer 19.6[4]

11	6.24 or 6.244 to 6.245	3	**M2** for $\sqrt{8^2 - 5^2}$ or **M1** for $8^2 = 5^2 + x^2$ or better
12	$2\frac{3}{12}$ or $1\frac{15}{12}$ or $\frac{27}{12}$ or $\frac{9 \times 3}{4 \times 3}$ *their* $(\frac{27}{12} - \frac{11}{12} = \frac{16}{12})$ oe $1\frac{1}{3}$ or $\frac{4}{3}$ cao	**M1** **M1** **A1**	Accept any correct conversion with common denominator $12k$ Correct resolving of *their* subtraction with denominator $12k$ showing full working Working and then simplified answer must both be seen
13	8.12 or 8.118…	3	**M2** for $\frac{12.4}{\sin 74} \times \sin 39$ or **M1** for implicit version $\frac{\sin 39}{y} = \frac{\sin 74}{12.4}$ oe
14	2500 nfww	3	**M2** for $2475 \div \left(1 - \frac{1}{100}\right)$ oe or **M1** for 2475 associated with 99%
15 (a) (b)	$(3w + 10)(3w - 10)$ final answer $(m + n)(p - 6q)$ oe final answer	1 2	 **B1** for $p(m + n) - 6q(m + n)$ oe or $\quad m(p - 6q) + n(p - 6q)$ oe
16	36.8 or 36.80 to 36.81	3	**M1** for $\frac{26}{360} \times 2 \times \pi \times 15$ **M1** for $2 \times 15 + $ a term involving π
17	175	3	**M1** for $y = k(x - 1)^2$ oe **A1** for $k = 7$ or **M2** for $\frac{63}{(4-1)^2} = \frac{y}{(6-1)^2}$ oe
18	16.2 16.6 nfww	3	**M1** for two of 2.35, 5.75, 2.45, 5.85 seen or $2 \times (5.8 - 0.05 + 2.4 \quad 0.05)$ or $2 \times (5.8 + 0.05 + 2.4 + 0.05)$ **A1** 16.2 or 16.6 in either answer space If zero scored **SC2** for both correct reversed answers provided 16.6 nfww

19	$\sqrt{(-6)^2 - 4(5)(-3)}$ or better seen	**B1**	If completing the square **B1** for $\left(x - \dfrac{3}{5}\right)^2$ oe
	if $\dfrac{p + \sqrt{q}}{r}$ or $\dfrac{p - \sqrt{q}}{r}$ seen then $p = -(-6)$ and $r = 2 \times 5$	**B1**	**B1** for $\dfrac{3}{5} + \sqrt{\dfrac{3}{5} + \left(\dfrac{3}{5}\right)^2}$ or $\dfrac{3}{5} - \sqrt{\dfrac{3}{5} + \left(\dfrac{3}{5}\right)^2}$ oe
	-0.38 1.58 cao final answers	**B1** **B1**	If B0, **SC1** for -0.4 and 1.6 or $-0.379[795..]$ and $1.579[795..]$ or -1.58 and 0.38 as final answers or -0.38 and 1.58 seen in working
20 (a)		**B1** **B1**	line from (0, 8) to (10, 8) line from *their* (10, 8) to (55, 0)
(b)	260	**3FT**	**M2FT** for $8 \times 10 + 0.5 \times 8 \times 45$ oe or for a fully correct area calculation for *their* graph or **M1FT** for 8×10 or $0.5 \times 8 \times 45$ or for one correct area calculation for *their* graph
21 (a)	12	**2**	**M1** for $\dfrac{7.2}{x} = \dfrac{15}{25}$ oe or better eg $7.2 \times \dfrac{25}{15}$
(b)	12.8	**3**	**M2** for $16 \times \sqrt[3]{\dfrac{192}{375}}$ oe or **M1** for $\sqrt[3]{\dfrac{192}{375}}$ or $\sqrt[3]{\dfrac{375}{192}}$ oe or $\left(\dfrac{16}{y}\right)^3 = \dfrac{375}{192}$ oe
22 (a)	3.5 nfww	**3**	**M1** for Σfx soi **M1** (dep) for $\div 24$
(b)	2 nfww	**3**	**M2FT** for $\dfrac{their\,84 + x}{25} = 3.44$ or better or **M1** for 25×3.44

23	(a)		$\dfrac{8}{14}$ and $\dfrac{5}{13}$	1	
			$\dfrac{6}{13}$ and $\dfrac{7}{13}$	1	
	(b)	(i)	$\dfrac{30}{182}$ oe	2	**M1FT** for $\dfrac{6}{14} \times \text{their}\, \dfrac{5}{13}$
		(ii)	$\dfrac{126}{182}$ oe	3	**M2FT** for $1 - \dfrac{8}{14} \times \dfrac{7}{13}$ or $\dfrac{6}{14} \times \dfrac{5}{13} + \dfrac{6}{14} \times \dfrac{8}{13} + \dfrac{8}{14} \times \dfrac{6}{13}$ or $\dfrac{6}{14} + \dfrac{8}{14} \times \dfrac{6}{13}$ oe or **M1FT** for sum of any two of $\dfrac{6}{14} \times \dfrac{5}{13}$ or $\dfrac{6}{14} \times \dfrac{8}{13}$ or $\dfrac{8}{14} \times \dfrac{6}{13}$

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