

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the March 2015 series

0580 MATHEMATICS

0580/22

Paper 2 (Paper 22 – 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	Negative	1	
2	96	2	B1 for $96k$ or $2^5 \times 3$ or for listing multiples of each up to 96
3	572.4	2	M1 for figs ($120 \times 90 \times 53$)
4	$7p(2p+3q)$	2	B1 for $7(2p^2+3pq)$ or $p(14p+21q)$
5	$18 - 5n$ oe	2	M1 for $5n$ or $-5n$
6 (a)	Correct arc centre B , radius 5.7	1	
(b)	Shading below CN outside arc	1FT	FT shading below CN outside their arc centre B
7	37	2	M1 for $180 - 90 - 53$ oe or B1 for 53 or the right angle, either marked in correct place on diagram
8 (a)	68	1	
(b)	15	2	M1 for $\frac{360}{n} = 24$ or $(n-2)180 = 156n$
9	400 350 250	3	M1 for $\frac{1000}{8+7+5}$ implied by 50 A1 for one clearly assigned correct answer or SC2 for 3 correct answers in wrong order
10 (a)	$x + x + 4 + x + 4 = 26$ oe	1	
(b)	6[.00] cao	2	M1 for their linear eqn simplified to $ax = b$

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11	<p>Correctly eliminating one variable [x =] 6</p> <p>[y =] $\frac{1}{4}$</p>	<p>M1 A1</p> <p>A1</p>	<p>If 0 scored SC1 for 2 values satisfying one of the original equations SC1 if no working shown but correct answers given</p>
12	44300 cao	3	<p>M1 for $50\,000 \times (0.97)^4$ oe and B1 for 44260 or better</p> <p>or SC1 for correct method for 3% increase with final answer of 56300</p>
13	12	3	<p>M1 for $x = k \sqrt[3]{y}$ oe A1 for $k=3$ or M2 for $\frac{6}{\sqrt[3]{8}} = \frac{x}{\sqrt[3]{64}}$ oe</p>
14	$3y + x = 19$ oe	3	<p>M1 for <i>their</i> $m \times 3 = -1$ oe or $-\frac{1}{3}$ soi M1 for $4 = 7 \times \textit{their } m + c$</p>
15 (a)	$\begin{pmatrix} 76 & 30 \\ 40 & 16 \end{pmatrix}$	2	B1 for two correct elements
(b)	$\frac{1}{4} \begin{pmatrix} 2 & -3 \\ -4 & 8 \end{pmatrix}$ oe	2	B1 for $k \begin{pmatrix} 2 & -3 \\ -4 & 8 \end{pmatrix}$ soi or $\frac{1}{4} \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ seen or $\det = 4$ soi
16	<p>$\frac{25}{9}$</p> <p>$\frac{a}{b} \times \frac{6}{5}$ where $a > b$</p> <p><i>Their</i> $\frac{150}{45}$ or <i>their</i> correct full cancelling</p> <p>$\frac{10}{3}$ or $3\frac{1}{3}$ nfw</p>	<p>B1</p> <p>M1</p> <p>M1FT dep</p> <p>A1</p>	<p>(Alt) $\frac{25}{9}$</p> <p><i>their</i> $\frac{25 \times 2}{9 \times 2} \div \frac{5 \times 3}{6 \times 3}$ oe</p> <p><i>their</i> $\frac{25 \times 2}{5 \times 3}$ oe or $\frac{50}{18} \div \frac{15}{18}$ oe with 18's cancelled</p>

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17	(a)	$b - a$	2	M1 if unsimplified or correct route in terms of P, Q, R, S
	(b)	$\frac{5}{8}x + \frac{3}{8}y$	2	M1 for a correct route e.g. $OX + XM$ or for $\frac{3}{8}\overrightarrow{XY}$ or $\frac{5}{8}\overrightarrow{YX}$
18		14.4 or 14.36...	4	M3 for $\tan = \frac{6}{\text{their } \sqrt{15^2 + 18^2}}$ oe or better or M1 for $AC = \sqrt{15^2 + 18^2}$ and M1 for identifying required angle
19		95	4	B1 for 2.3 or $2\frac{18}{60}$ M1 for $75 \div 30 (= 2.5)$ M1 for $\frac{381 + 75}{\text{their } 2.3 + \text{their } 2.5}$
20	(a)	35	2	M1 for $[Z =] 180 - 88 - 57$ or $VWX = 57$ or $YZX = 35$
	(b)	10.8	2	M1 for $\frac{AC}{7.2} = \frac{12.6}{8.4}$ oe
21	(a)	(i)	1	
		(ii)	m^7	1
		(iii)	$2p^2$	2
	(b)	$\frac{2}{5}$ or 0.4	2	B1 for 3^5 or 3^{5x} or $243^{\frac{1}{5}}$ or $243^{\frac{2}{5}}$ seen
22	(a)	17	2	M1 for $[g(-2) =] 4$ seen or for $5x^2 - 3$
	(b)	$25x^2 - 30x + 9$ or $(5x - 3)^2$ as final answer	2	M1 for $g(5x - 3)$
	(c)	$\frac{x+3}{5}$	2	M1 for $5x = y + 3$ or $x = 5y - 3$ or $\frac{y}{5} = x - \frac{3}{5}$