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 $ax=b$

11	Correctly eliminating one variable $[x =]\ 6$ $[y =]\frac{1}{4}$	**M1** **A1** **A1**	 If 0 scored **SC1** for 2 values satisfying one of the original equations **SC1** if no working shown but correct answers given
12	44 300 cao	**3**	**M1** for $50\,000 \times (0.97)^4$ oe and **B1** for 44260 or better or **SC1** for correct method for 3% increase with final answer of 56300
13	12	**3**	**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
14	$3y + x = 19$ oe	**3**	**M1** for *their m* × 3 = –1 oe or $-\frac{1}{3}$ soi **M1** for 4 = 7 × *their m* + *c*
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	$\frac{25}{9}$ $\frac{a}{b} \times \frac{6}{5}$ where $a > b$ *Their* $\frac{150}{45}$ or *their* correct full cancelling $\frac{10}{3}$ or $3\frac{1}{3}$ nfww	**B1** **M1** **M1FT dep** **A1**	(Alt) $\frac{25}{9}$ $\frac{\textit{their}25 \times 2}{9 \times 2} \div \frac{5 \times 3}{6 \times 3}$ oe $\frac{\textit{their}25 \times 2}{5 \times 3}$ oe or $\frac{50}{18} \div \frac{15}{18}$ oe with 18's cancelled

17	**(a)**	**b – a**	**2**	**M1** if unsimplified or correct route in terms of *P,Q,R, S*
	(b)	$\frac{5}{8}\mathbf{x} + \frac{3}{8}\mathbf{y}$	**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 $= \frac{6}{their\sqrt{15^2+18^2}}$ 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 ÷ 30 (= 2.5) **M1** for $\frac{381+75}{their\ 2.3 + their\ 2.5}$
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	**1**	
	(ii)	m^7	**1**	
	(iii)	$2p^2$	**2**	**SC1** for $2p^k$ or kp^2 $k \neq 0$
	(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 $\frac{y}{5} = x - \frac{3}{5}$