

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

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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
nfw	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	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 <i>their</i> $m \times 3 = -1$ oe or $-\frac{1}{3}$ soi M1 for $4 = 7 \times \text{their } m + c$
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 $a > b$ <i>Their</i> $\frac{150}{45}$ or <i>their</i> correct full cancelling $\frac{10}{3}$ or $3\frac{1}{3}$ nfw	B1 M1 M1FT dep A1	(Alt) $\frac{25}{9}$ $\frac{\text{their } 25 \times 2}{9 \times 2} \div \frac{5 \times 3}{6 \times 3}$ oe $\frac{\text{their } 25 \times 2}{5 \times 3}$ oe or $\frac{50}{18} \div \frac{15}{18}$ oe with 18's cancelled

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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	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 $\frac{y}{5} = x - \frac{3}{5}$