

**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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Page 2	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – March 2015	0580	22

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

Page 3	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – March 2015	0580	22

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

Page 4	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – March 2015	0580	22

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