

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2014 series**0580 MATHEMATICS****0580/22**

Paper 2 (Extended), maximum raw mark 70

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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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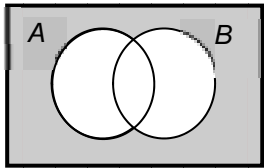
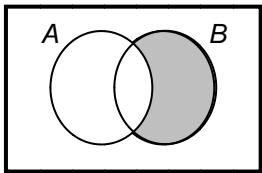
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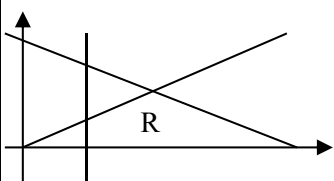
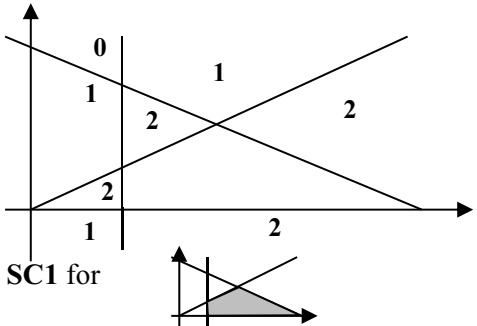
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Abbreviations

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	$6 + 5 \times (10 - 8) = 16$	1	One pair of brackets only
2	20	1	
3	8	1	
4	<p>ξ </p> <p>ξ </p>	1 1	
5	$v^3 - p$	2	M1 for $v^3 = v + r$
6	95.5 96.5 in correct place; cao	2	B1 for 95.5 or 96.5 in correct place or for answers reversed
7 (a)	700	2	M1 for 2800×0.325
(b)	0.28	1	
8	<p>$\frac{7}{6}$ oe</p> <p>their $\frac{7}{6} \times \frac{8}{7}$ oe</p> <p>$\frac{4}{3}$ or $1\frac{1}{3}$ cao</p> <p>must see working</p>	B1 M1 A1	O·M1 for $\frac{56}{48} \div \frac{42}{48}$ or equivalent division with fractions with common denominator

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9	9.13 or 9.127 to 9.1271	3	<p>M2 for $\sqrt[3]{\frac{1000}{440}}$ [1.31] oe</p> <p>or $\sqrt[3]{\frac{440}{1000}}$ [0.761] oe</p> <p>Or M1 for $\frac{1000}{440}$ [2.27] oe</p> <p>or $\frac{440}{1000}$ [0.44] oe</p> <p>or $\sqrt[3]{\frac{\text{figs } 440}{\text{figs } 1000}}$ or $\sqrt[3]{\frac{\text{figs } 1000}{\text{figs } 440}}$</p>
10	97.2[0]	3	<p>M1 for $C = kr^2$</p> <p>A1 for $k = 30$</p> <p>or M2 for $\frac{202.8}{2.6^2} = \frac{c}{1.8^2}$ oe</p>
11 (a)	$\begin{pmatrix} 6 & 4 \\ 8 & 38 \end{pmatrix}$	2	<p>M1 for a 2 by 2 matrix with two correct elements</p> <p>SC1 for $\begin{pmatrix} 16 & 14 \\ 18 & 28 \end{pmatrix}$</p>
(b)	14	1	
12		3	<p></p> <p>SC1 for</p>
13	13.5 or 13.45[..]	3	<p>M2 for $\sqrt{\frac{2 \times 85}{\sin 110}}$</p> <p>or M1 for $\frac{1}{2} \times a^2 \times \sin 110 = 85$</p> <p>or $\frac{2 \times 85}{\sin 110}$ oe [180.9..]</p>
14 (a)	2.47 or 2.474 to 2.4744	2	M1 for $\frac{56}{360} \times \pi \times 2.25^2$ oe
(b)	0.742 or 0.7422 to 0.74232	1FT	FT <i>their</i> (a) $\times 0.3[0]$ correctly evaluated.

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15	(a)	$2 \times 3 \times 3 \times 5$	2	B1 for 2, 3, [3] and 5 identified as only prime factors or M1 for partial prime factorisation $6 \times 3 \times 5$ or $2 \times 9 \times 5$ or $3 \times 3 \times 10$ or $2 \times 3 \times 15$
	(b)	630	2	M1 for $2 \times 3^2 \times 5 \times 7$ oe or for listing multiples of 90 and 105 at least up to 630
16	(a)	108 Angle at centre is twice angle at circumference oe	1 1	
	(b) (i)	$-\frac{4}{3}$ oe	1	
	(b) (ii)	-1	1	
17	[0.]08	4	M3 for $200 \times \left(1 + \frac{2}{100}\right)^2 - 200 - \frac{200 \times 2 \times 2}{100}$ oe or M1 for $200 \times \left(1 + \frac{2}{100}\right)^2$ and M1 for $\frac{200 \times 2 \times 2}{100}$ [+200]	
18	(a)	56	2	B1 for 16 soi or M1 for 72 – <i>their</i> 16
	(b) (i)	63 or 63 to 63.5	1	
	(b) (ii)	22 or 21.6 to 23 nfw	2	B1 for 49.8 to 50.2 seen or 71.8 to 72.8
19	(a) (i)	$\mathbf{c - a}$	1	
	(a) (ii)	$-\frac{1}{3} \mathbf{a} + \frac{1}{3} \mathbf{c}$	3	M2 for $-\mathbf{a} + \frac{1}{3}(\mathbf{c} + 2\mathbf{a})$ oe e.g. $-\mathbf{a} + \mathbf{c} + 2\mathbf{a} - \frac{2}{3}(\mathbf{c} + 2\mathbf{a})$ Or M1 for a correct route from A to X
	(b)	\overrightarrow{AC} is a multiple of \overrightarrow{AX} and they share a common point [A]	1 1	oe oe

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20	(a)	102 to 106	2	B1 for 5.1 to 5.3 seen
	(b)	Correct position of F with correct arcs for angle bisector	5	B2 for Correct ruled angle bisector of A with correct arcs or B1 for correct bisector with no/wrong arcs and B2 for Arc centre C , radius 8 cm or B1 for arc centre C with incorrect radius or correct conversion to 8cm and B1 for marking position of F on <i>their</i> bisector and 8cm from C or on <i>their</i> arc centre C
21	(a)	$\frac{x+7}{(2x-1)(x+2)}$ Final answer	3	B1 for $3(x+2) - 1(2x-1)$ seen or better B1 for denominator $(2x-1)(x+2)$ oe seen SC2 for final answer $\frac{x+5}{(2x-1)(x+2)}$
	(b)	$\frac{2x}{x+7}$ Final answer	4	M1 for $4x(x-4)$ or partial factorisation of numerator and M2 for $[2](x+7)(x-4)$ oe or M1 for $[2](x^2+3x-28)$ or $[2](x+a)(x+b)$ where $ab = -28$ or $a+b = 3$ SC3 for answer $\frac{4x}{2x+14}$ oe