CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2014 series

0581 MATHEMATICS

0581/22 Paper 2 (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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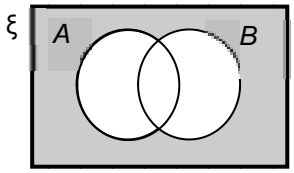
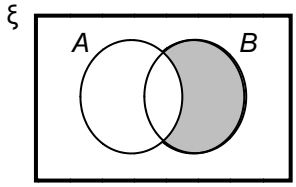
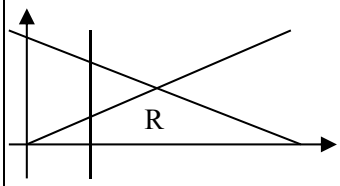
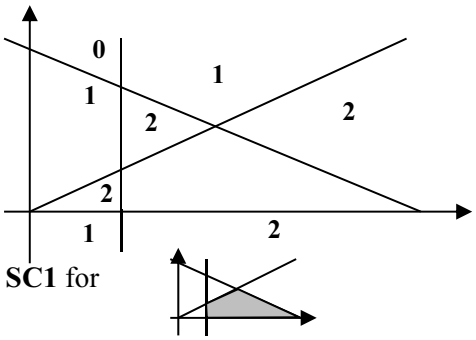
Abbreviations

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	$6 + 5 \times (10 - 8) = 16$	**1**	One pair of brackets only
2	20	**1**	
3	8	**1**	
4	 	**1** **1**	
5	$v^3 - p$	**2**	**M1** for $v^3 = p + r$
6	95.5 96.5 in correct places 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	$\frac{7}{6}$ oe *their* $\frac{7}{6} \times \frac{8}{7}$ oe $\frac{4}{3}$ or $1\frac{1}{3}$ cao must see working	**B1** **M1** **A1**	Or **M1** for $\frac{56}{\cancel{48}} \div \frac{42}{\cancel{48}}$ or equivalent division with fractions with common denominator

9	9.13 or 9.127 to 9.1271	**3**	**M2** for $\sqrt[3]{\frac{1000}{440}}$ [1.31] oe or $\sqrt[3]{\frac{440}{1000}}$ [0.761] oe Or **M1** for $\frac{1000}{440}$ [2.27] oe or $\frac{440}{1000}$ [0.44] oe or $\sqrt[3]{\frac{figs440}{figs1000}}$ or $\sqrt[3]{\frac{figs1000}{figs440}}$
10	97.2[0]	**3**	**M1** for $C = kr^2$ **A1** for $k = 30$ or **M2** for $\frac{202.8}{2.6^2} = \frac{c}{1.8^2}$ oe
11 (a)	$\begin{pmatrix} 6 & -4 \\ -8 & 38 \end{pmatrix}$	**2**	**M1** for a 2 by 2 matrix with two correct elements **SC1** for $\begin{pmatrix} 16 & -14 \\ -18 & 28 \end{pmatrix}$
(b)	14	**1**	
12		**3**	 **SC1** for
13	13.5 or 13.45[..]	**3**	**M2** for $\sqrt{\frac{2 \times 85}{\sin 110}}$ or **M1** for ½ × a^2 × sin 110 = 85 or $\frac{2 \times 85}{\sin 110}$ oe [180.9..]
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 *their* **(a)** × 0.3[0] correctly evaluated.

15 **(a)**	$2 \times 3 \times 3 \times 5$	**2**	**B1** for 2, 3, [3] and 5 identified as 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	**1**	
	Angle at **centre** is **twice** angle at **circumference** oe	**1**	
(b) **(i)**	$-\frac{4}{3}$ oe	**1**	
(ii)	-1	**1**	
17	[0.]08	**4**	**M3** for $200\times\left(1+\frac{2}{100}\right)^2-200-\frac{200\times2\times2}{100}$ oe or **M1** for $200\times\left(1+\frac{2}{100}\right)^2$ **and M1** for $\frac{200\times2\times2}{100}$ [+200]
18 **(a)**	56	**2**	**B1** for 16 soi or **M1** for 72 – *their* 16
(b) **(i)**	63 or 63 to 63.5	**1**	
(ii)	22 or 21.6 to 23 nfww	**2**	**B1** for 49.8 to 50.2 seen or 71.8 to 72.8
19 **(a)** **(i)**	$\mathbf{c} - \mathbf{a}$	**1**	
(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 $\overrightarrow{AX}$	**1**	oe
	and they share a common point [A]	**1**	oe

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* 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 *their* bisector and 8cm from *C* or on *their* 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