CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the May/June 2015 series

0580 MATHEMATICS

0580/22 Paper 2 (Extended), maximum raw mark 70

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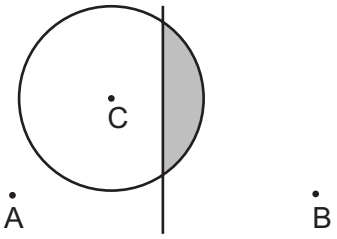
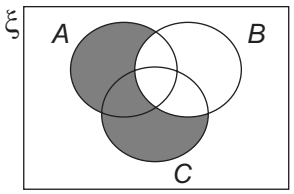
Abbreviations

cao correct answer only
dep dependent
FT follow through after error
isw ignore subsequent working
oe or equivalent
SC Special Case
nfww not from wrong working
soi seen or implied

Question	Answer	Mark	Part marks
1	5.34×10^7	**1**	
2	9 [h] 30 [min] cao	**1**	
3	$\frac{1}{4}$ or 0.25	**1**	
4 (a)	7	**1**	
(b)	Any number except 3, 7 or 20	**1**	
5	0.2 oe	**2**	**M1** for $1 - (0.15 + 0.3 + 0.35)$
6	8×10^3 or 8000 nfww	**2**	**M1** for $w + 4 \times 10^3 = 1.2 \times 10^4$ oe or $5w + 20 \times 10^3 = 6 \times 10^4$ oe
7	Parallel	**1**	
	Same length	**1**	
8	$2n^2 + 3$ oe final answer	**2**	**M1** for a quadratic expression as final answer or $2n^2 + 3$ oe in working
9	$\frac{23}{90}$ oe, must be fraction	**2**	**M1** for $25.\dot{5} - 2.\dot{5}$ oe e.g. $2.55^r - 0.25^r$ or **B1** for $\frac{k}{90}$
10	7	**2**	**B1** for 120.5 or 113.5 seen
11	$\frac{1}{5}\begin{pmatrix} -2 & -1 \\ 11 & 3 \end{pmatrix}$ oe	**2**	**M1** for $k\begin{pmatrix} -2 & -1 \\ 11 & 3 \end{pmatrix}$ soi or $\frac{1}{5}\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ or det = 5 soi

12		$\frac{8}{3}$ $\frac{4}{5} \times$ *their* $\frac{3}{8}$ oe $\frac{3}{10}$ cao	**B1** **M1** **A1**	or $\frac{40}{15}$ accept $\frac{3}{8}$ or $\frac{15}{40}$ or $\frac{12}{15} \div$ *their* $\frac{40}{15}$ or equivalent division with fractions with common denominators
13	**(a)**	11	**1**	
	(b)	8	**2FT**	**FT** $30 - 2 \times$ *their* **(a)** or **M1** for $4 \times 7 = 2(x - 1) + FG$ oe or $4(x - 4) = 2(x - 1) + FG$ oe or $2 \times 7 + 2(x - 4) = 2(x - 1) + FG$ oe Allow x to be *their* **(a)** in each
14		684	**3**	**M2** for $0.95 \times 4 \times 3 \times 60$ or **M1** for 0.95×4 [$\times 3$] or $4 \times 3 \times 60$ or $0.95 \times 3 \times 60$ or $0.95 \times 4 \times 60$
15		$\frac{2x - 23}{(x + 2)(2x - 5)}$ final answer	**3**	**B1** for a common denominator of $(x + 2)(2x - 5)$ **B1** for $3(2x - 5) - 4(x + 2)$ or better or **SC2** for final answer $\frac{2x - 7}{(x + 2)(2x - 5)}$ or **SC1** for numerator of $2x - 7$ in final answer
16	**(a) (i)**	0.5 or – 0.5 or $\frac{1}{2}$ or $-\frac{1}{2}$	**1**	
	(ii)	4	**1**	
	(b)	1.37 or 1.37[4…]	**1**	
17	**(a)**	[$y =$] $2x + 3$ cao	**3**	**M2** for correct unsimplified equation or **B1** for gradient = $(11 - 3) \div (4 - 0)$ or better and **B1** for $c = 3$
	(b)	$-\frac{1}{2}$ oe	**1FT**	$-1 \div$ *their* m

18	**(a)**	78	**3**	**M2** for $5 \times 12 + \frac{1}{2} \times 12 \times (8 - 5)$ **or** $\frac{1}{2} \times 6 \times (5 + 8) \times 2$ oe or **M1** for 5×12, $\frac{1}{2} \times 12 \times (8 - 5)$, $\frac{1}{2} \times 6 \times (5 + 8)$ or $12 \times 8 - (\ldots)$
	(b)	1170	**1FT**	$15 \times$ *their* **(a)**
19	**(a)**		**1**	Correct circle, radius 4 cm centre C
	(b)		**2**	**B2** for correct bisector with 2 pairs of correct arcs or **B1** for correct bisector with no/wrong arcs
	(c)		**1**	Correct complete boundary and correct shading. Dep on at least **B1** in **(b)**
20	**(a) (i)**	4	**1**	
	(ii)	{3, 9}	**1**	
	(iii)	fewer than 6 numbers from {1, 3, 5, 7, 9, 11} or ∅	**1**	
	(b)		**1**	
21	**(a)**	$m = 2$ $n = -10$	**2**	**B1** for $m = 2$ **B1** for $n = -10$ If 0 scored **SC1** for $(x + 2)^2$ in working or $x^2 + 2mx + m^2 + n$ and equating coefficients $2m[x] = 4[x]$ or $m^2 + n = -6$
	(b)	**1.16** or 1.16[2…] from completing square	**2FT**	**FT** dep on negative n **B1** for $(x + \textit{their } m)^2 = -\textit{their } n$ or **SC1** for correct answer from using formula or for both answers 1.16 **and** –5.16 whatever method used

22	**(a)**	44	**2**	**M1** for 48 soi
	(b)	24	**2**	**M1** for 40 or 16 or both lines drawn from 15 **and** 45 across and down to the horizontal axis
	(c)	5	**2**	**M1** for answer 55 or line or mark on graph indicating 55
23	**(a)**	0.4 or $\frac{2}{5}$	**1**	
	(b)	1430	**3**	**M2** for correct, complete, area statement e.g. $120 \times 10 + \frac{1}{2} \times 20 \times 8 + \frac{1}{2} \times 30 \times 10$ oe or **M1** for one area calculation e.g. 10×120 or $\frac{1}{2} \times 20 \times 8$ or $\frac{1}{2} \times 30 \times 10$
	(c)	11.9 or 11.91 to 11.92	**1FT**	*their* **(b)** ÷ 120
24	**(a)**	$9x^2$	**1**	
	(b)	$\frac{x-5}{3}$	**2**	**M1** for correct first algebraic step e.g. $y - 5 = 3x$ or $\frac{y}{3} = x + \frac{5}{3}$ or better or for interchanging x and y, e.g. $x = 3y + 5$, this does not need to be the first step
	(c)	$9x + 20$ cao final answer	**2**	**M1** for $3(3x + 5) + 5$