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

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.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2015 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

® IGCSE is the registered trademark of Cambridge International Examinations.

CAMBRIDGE
International Examinations

Abbreviations

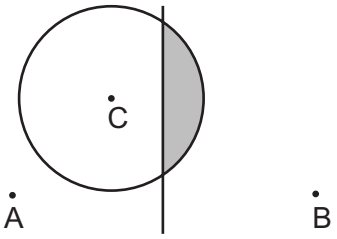
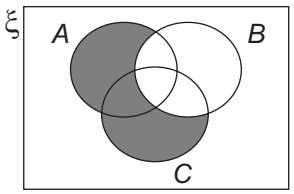
cao correct answer only
dep dependent
FT follow through after error
isw ignore subsequent working
oe or equivalent
SC Special Case
nfww not from wrong working
soi seen or implied

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

© Cambridge International Examinations 2015

12		$\frac{8}{3}$ $\frac{4}{5} \times \textit{their} \frac{3}{8}$ oe $\frac{3}{10}$ cao	**B1** **M1** **A1**	or $\frac{40}{15}$ accept $\frac{3}{8}$ or $\frac{15}{40}$ or $\frac{12}{15} \div \textit{their} \frac{40}{15}$ or equivalent division with fractions with common denominators
13	**(a)**	11	**1**	
	(b)	8	**2FT**	**FT** 30 – 2 × *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*

© Cambridge International Examinations 2015

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

© Cambridge International Examinations 2015

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 $3(3x + 5) + 5$

© Cambridge International Examinations 2015