

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International General Certificate of Secondary Education

**MARK SCHEME for the May/June 2015 series**

**0580 MATHEMATICS**

**0580/43**

Paper 4 (Extended), maximum raw mark 130

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<sup>®</sup>, Cambridge International A and AS Level components and some Cambridge O Level components.

<b>Page 2</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge IGCSE – May/June 2015</b>	<b>0580</b>	<b>43</b>

### Abbreviations

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

Qu		Answers	Mark	Part Marks
1	(a)	(i) Triangle at $(-3, 1), (-3, 3), (-4, 3)$	2	<b>SC1</b> for reflection in line $y = -1$ at $(1, -3), (1, -5), (2, -5)$ or reflection in any vertical line or three correct points not joined  <b>SC1</b> for rotation $180^\circ$ but other centre or three correct points not joined
		(ii) Triangle at $(-1, -1), (-2, -3), (-1, -3)$	2	
	(b)	(i) Translation	1	
		$\begin{pmatrix} -2 \\ 2 \end{pmatrix}$ oe	1	
		(ii) Enlargement	1	
		$(0, 3)$	1	
	[factor] 3	1		
2	(a)	(i) $640 \times 1.02^6$ oe $= 720.7\dots$	<b>M1</b> <b>B1</b>	Must be seen  <b>M3</b> for $[x = ] \sqrt[4]{721 \div 640}$ or better (implied by answer of $1.03[02\dots]$ or $r = 0.0302[4\dots]$ or <b>M2</b> for $(their\ x)^4 = 721 \div 640$  or <b>M1</b> for $640 \times (their\ x)^4 = 721$ oe
		(ii) 3.02 or 3.020 to 3.024... nfw	4	
	(b)	874.8[0] final answer	2	

Page 3	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	0580	43

Qu		Answers	Mark	Part Marks	
3	(a)	1	1		
		3	1		
		2.5	1		
	(b)	Fully correct graph	5		<p><b>B3FT</b> for 11, 12 points correct or <b>B2FT</b> for 9, 10 correct points or <b>B1FT</b> for 7, 8 correct points</p> <p><b>B1</b> for branch each side of <math>y</math>-axis and not touching <math>y</math>-axis</p> <p><b>SC4</b> for correct graph but branches joined</p>
	(c)	$-2.6$ to $-2.4$	1		
(d)	Correct ruled line fit for purpose $-1.6$ to $-1.5$	2 1	<p><b>SC1</b> for ruled line through <math>(0, 1)</math> but not <math>y = 1</math> or ruled line with gradient <math>-1</math> or for correct line but freehand</p>		
(e)	Correct tangent and $0.9 \leq \text{grad} \leq 1.5$	3	<p>Consider point of contact as midpoint between two vertices of daylight, the midpoint must be between <math>x = -3.4</math> and <math>-2.6</math></p> <p><b>B2</b> if close attempt at correct tangent and answer in range (may be small amount of daylight)</p> <p>or <b>B1</b> for ruled tangent at <math>x = -3</math> within tolerance, no daylight at the point of contact</p> <p><b>and M1 (dep on B1 or close attempt at tangent) for a tangent at any point and <math>\frac{\text{rise}}{\text{run}}</math> used</b></p>		
4	(a)	72.5	3	<p><b>M1</b> for <math>\Sigma fm</math> with correct frequencies and correct mid-interval values</p> <p><b>M1</b> for <math>\div 200</math> <b>dep</b> on first <b>M1</b></p>	
	(b)	Correct histogram	4	<p><b>B1</b> four correct widths – no gaps</p> <p><b>B3</b> for blocks of correct heights 0.5, 5, 16, 4 or <b>B2</b> for 3 blocks of correct heights or <b>B1</b> for 2 blocks of correct heights If 0 scored for the heights then <b>SC1</b> for all four frequency densities soi</p>	

Page 4	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	0580	43

Qu		Answers	Mark	Part Marks
5	(a)	(i) $\frac{4}{7}$ oe	1	
		(ii) $\frac{6}{7}$ oe	1	
		(iii) $\frac{5}{7}$ oe	1	
	(b)	(i) $\frac{12}{42}$ oe nfw	2	M1 for $\frac{4}{7} \times \frac{3}{6}$
		(ii) $\frac{28}{42}$ oe nfw	3	M2 for $\frac{4}{7} \times \frac{3}{6} + \frac{2}{7} \times \frac{5}{6} + \frac{1}{7}$ or $1 - \frac{4}{7} \times \frac{3}{6} - \frac{2}{7} \times \frac{1}{6}$ oe or M1 for the sum of two terms of $\frac{4}{7} \times \frac{3}{6}, \frac{2}{7} \times \frac{5}{6}, \frac{1}{7}$
(c)	$\frac{120}{210}$ oe nfw	2	M1 for $\frac{6}{7} \times \frac{5}{6} \times \frac{4}{5}$ or $\left(\frac{4}{7} \times \frac{3}{6} \times \frac{2}{5}\right) + 3\left(\frac{4}{7} \times \frac{3}{6} \times \frac{2}{5}\right) + 3\left(\frac{4}{7} \times \frac{2}{6} \times \frac{1}{5}\right)$ oe	

Page 5	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	0580	43

Qu		Answers	Mark	Part Marks
6	(a)	100 nfw	4	<b>M3</b> for a correct calculation that would lead to the answer or <b>B2</b> two correct relevant different size angles in <i>their</i> diagram or one relevant angle <b>and</b> total in <i>their</i> polygon or angle $EDA + \text{angle } FAD = 140$ or <b>B1</b> for one relevant angle or total in <i>their</i> polygon
	(b) (i)	50	2	<b>B1</b> for angle $ADC = 80$ or angle $BAC = 30$ or angle $ADB = 50$ soi
	(ii)	41	2FT	<b>FT 91</b> – <i>their</i> (b)(i) <b>B1</b> for angle $XBC = 41$
	(iii)	Similar	1	
	(c)	27.8 or 27.83	2	<b>M1</b> for evidence of $\left(\frac{11}{10}\right)^2$ or 1.21 or $\left(\frac{10}{11}\right)^2$ or 0.826(4...)
	(d) (i)	60	3	<b>M2</b> for $\frac{n}{10} = \frac{360}{n}$ oe e.g. $\frac{180(n-2)}{n} = 180 - \frac{n}{10}$ or <b>B1</b> for exterior sum = 360 or $180(n-2)$ seen
	(ii)	174	2	<b>M1</b> for $\frac{\text{their } n}{10}$ or $\frac{360}{\text{their } n}$ for <i>their</i> $n < 1800$

Page 6	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	0580	43

Qu		Answers	Mark	Part Marks	
7	(a)	(i) 331 or 331.1 to 331.2	2	<b>M1</b> for $\pi \times 6.2 \times 10.8 + \pi \times 6.2^2$	
		(ii) $\frac{A - \pi r^2}{\pi r}$ oe final answer	2	<b>M1</b> for correct re-arrangement isolating term in $l$  <b>M1</b> for correct division by $\pi r$	
	(b)	(i) 4.39 or 4.390...		3	<b>M2</b> for $18 \div \left(\frac{10}{4} + \frac{8}{5}\right)$  or <b>M1</b> for $\frac{10}{4}$ or $\frac{8}{5}$
			(ii) $x + x + 4$ oe	<b>B1</b>	Must be seen
		$\frac{x}{5}$ or $\frac{x+4}{10}$	<b>B1</b>	Must be seen	
		$\frac{x+x+4}{\frac{x}{5} + \frac{x+4}{10}} = 7$ oe	<b>M2</b>	or <b>M1</b> for evidence of total distance $\div$ <i>their</i> total time	
	(c)	(i) 16.5[0] final answer	3	<b>M2</b> for $19.8 \div \left(1 + \frac{20}{100}\right)$ oe  or <b>M1</b> for evidence of $(100 + 20)\%$ associated with 19.8	
		(ii) $\frac{100x}{100+y}$ final answer	3	<b>B2</b> for $\frac{x}{1 + \frac{y}{100}}$ or $\frac{x}{1 + 0.01y}$ oe  or <b>B1</b> for $1 + \frac{y}{100}$ or $100 + y$ or $1 + 0.01y$ seen	

Page 7	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	0580	43

Qu		Answers	Mark	Part Marks
8	(a)	28.3 or 28.29...	2	<b>M1</b> for $180\,000 \div (\pi \times 45^2)$
	(b) (i)	360 000	3	<b>M2</b> for $\frac{1}{2}(70+50) \times 40 \times 150$ oe or <b>M1</b> for $\frac{1}{2}(70+50) \times 40$ oe or <i>their</i> area of $ABCD \times 150$ dependent on <i>their</i> area being two dimensional
		(ii)	360	1FT
	(c)	3 h 20 min	3	<b>M2</b> for $180\,000 \div 15 \div 60$ (implied by 200) or <b>M1</b> for $180\,000 \div 15$ (implied by 12000) or correct conversion of <i>their</i> seconds into h and min
	(d) (i)	$\frac{h}{40} = \frac{\frac{1}{2}(x-50)}{10}$ oe $h = 2(x-50)$	<b>M1</b>	i.e. a correct statement from similar figures which must contain $h$ , $x$ and numbers
		(ii)	$\frac{1}{2}(x+50) 2(x-50)$	<b>M1</b>
	(iii)	60.8 or 60.82 to 60.83	2	<b>M1</b> for $(x^2 - 2500) \times 150 = 180\,000$ or better
	(iv)	21.7 or 21.65 to 21.66	1FT	<b>FT</b> for $2(\textit{their} \text{ (d)(iii)} - 50)$ evaluated only if $x > 50$

Qu		Answers	Mark	Part Marks
9	(a)	$\begin{pmatrix} 2 & 13 \\ 1 & 14 \end{pmatrix}$	2	<b>SC1</b> for one correct column or row
	(b)	$\frac{1}{3}\begin{pmatrix} 3 & -2 \\ 0 & 1 \end{pmatrix}$ oe isw	2	<b>B1</b> for $k\begin{pmatrix} 3 & -2 \\ 0 & 1 \end{pmatrix}$ oe for $k \neq 0$ or $\frac{1}{3}\begin{pmatrix} a & c \\ b & d \end{pmatrix}$
	(c)	$[u = ] 3$ $[v = ] 2$	3	<b>B2</b> for two of $3 = u, 2u + 3v = 4u, 4 = 2 + v, u + 4v = 3 + 4v$ or <b>B1</b> for one  or <b>M1</b> for $\begin{pmatrix} 2 & 3 \\ 1 & 4 \end{pmatrix}\begin{pmatrix} 0 & u \\ 1 & v \end{pmatrix} = \begin{pmatrix} 0 & u \\ 1 & v \end{pmatrix}\begin{pmatrix} 2 & 3 \\ 1 & 4 \end{pmatrix}$  <b>B1</b> for $\begin{pmatrix} 3 & 2u + 3v \\ 4 & u + 4v \end{pmatrix}$ or $\begin{pmatrix} u & 4u \\ 2 + v & 3 + 4v \end{pmatrix}$
	(d)	12 nfw	2	<b>M1</b> for $w \times 2 - 8 \times 3 [= 0]$ oe
10	(a)	9	2	<b>B1</b> for $[f(3) = ] 5$ or $2(2x - 1) - 1$
	(b)	$4x^2 - 2x$ or $2x(2x - 1)$ final answer	3	<b>M1</b> for $(2x - 1)^2 + (2x - 1)$ <b>B1</b> for $[(2x - 1)^2 = ] 4x^2 - 2x - 2x + 1$ or $(2x - 1)(2x - 1 + 1)$
	(c)	$\frac{x+1}{2}$ oe final answer	2	<b>M1</b> for $x = 2y - 1$ or $y + 1 = 2x$  or $\frac{y}{2} = x - \frac{1}{2}$
	(d)	$\frac{4x+4}{x(x+2)}$ or $\frac{4x+4}{x^2+2x}$ or $\frac{4(x+1)}{x(x+2)}$  or $\frac{4(x+1)}{x^2+2x}$ final answer	4	<b>B1</b> for $x(x+2)$ oe isw as common denominator  <b>B2</b> for $4x + 4$ as numerator or <b>B1</b> for $2(x+2) + 2x$ or better as numerator



Page 9	Mark Scheme	Syllabus	Paper
	Cambridge IGCSE – May/June 2015	0580	43

Qu		Answers	Mark	Part Marks
11	(a)	$\frac{5}{7}$ $\frac{n}{n+2}$ oe 7 $n+2$ oe 3 $n-2$ oe 21 $n^2-4$ oe	8	B1 each
	(b)	72	2	M1 for $\frac{72}{74}$ or their $\frac{n}{n+2} = \frac{36}{37}$
	(c)	27	2	M1 for their $(n^2 - 4) = 725$ or $25 \times 29 [= 725]$