



Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

MATHEMATICS

0580/21

Paper 2 (Extended)

May/June 2016

MARK SCHEME

Maximum Mark: 70

Published

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

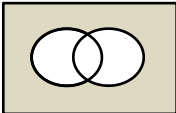
cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfw	not from wrong working
soi	seen or implied

Question	Answer	Mark	Part marks
1	8(h) 52 (min)	1	
2	3.75 or $3\frac{3}{4}$	1	
3	[0].00127	1	
4	157 900 cao	2	B1 for 158000 or 157860 or 157862 to 157863 If zero scored, SC1 for <i>their</i> answer to more than 4 figs correctly rounded to 4 sf
5	393	2	B1 for 393.1 to 393.2 or M1 for $2000 \div 5.087$
6	144	2	M1 for finding a correct product of prime factors or correctly listing a minimum of 3 multiples of 36 and 48 or for answer $2^4 \times 3^2$ oe or $144k$
7	11	2	M1 for $-2 \times -7 - 3$ soi
8	$\frac{py}{q}$ final answer	2	M1 for one correct step
9	[a =] 70 [b =] 40	2	B1 for each
10	28.35 cao	2	B1 for 9.45 seen or M1 for $(9.4 + 0.05) \times 3$
11 (a)	112	1	
(b)	56	1	
12	$2p^4$ final answer	2	B1 for kp^4 or $2p^k$ as answer
13	$n > 3.75$	2	M1 for $7 + 8 < 5n - n$ oe
14	More than 20m from <i>D</i> oe Nearer to <i>CD</i> than to <i>CB</i> oe	2	B1 for each

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Question	Answer	Mark	Part marks
15 (a)	-3	1	
(b)	$9 - 2n$ oe	2	B1 for $-2n + k$ or $dn + 9$ where $d \neq 0$
16	$\frac{6}{7} \times \frac{3}{5}$ or $\frac{18}{21} \div \frac{35}{21}$ oe $\frac{18}{35}$ cao	M2 A1	B1 for $\frac{5}{3}$ oe or M1 for $\frac{6}{7} \times \text{their } \frac{3}{5}$
17	145	3	M2 for $(6 - 2) \times 180 - 5 \times 115$ or M1 for $(6 - 2) \times 180$ <u>Alt method</u> M2 for $180 - (360 - 5 \times (180 - 115))$ or M1 for $360 - 5 \times (180 - 115)$
18	1.38 or 1.381 to 1.382	3	M2 for $(36 + 4.3) \div (105 \times \frac{1000}{60 \times 60})$ oe or M1 for $105 \times \frac{1000}{60 \times 60}$ or for a distance \div a speed or SC2 for answer 1.23(4...)
19	$\frac{5}{6}$ oe	3	M2 for $1 - \frac{2}{3} \times \frac{1}{4}$ or $\frac{1}{3} + \frac{2}{3} \times \frac{3}{4}$ or $\frac{1}{3} \times \frac{3}{4} + \frac{1}{3} \times \frac{1}{4} + \frac{2}{3} \times \frac{3}{4}$ or M1 for $\frac{2}{3} \times \frac{1}{4}$ or $\frac{1}{3} \times \frac{1}{4} + \frac{2}{3} \times \frac{3}{4}$
20	27	3	M2 for $\frac{6\pi}{\pi \times 2 \times 9} \times \pi \times 9^2$ oe or M1 for $\frac{6\pi}{\pi \times 2 \times 9}$ oe
21	2	3	M1 for $y = k\sqrt{x}$ A1 for $k = 4$ or M2 for $\frac{\sqrt{9}}{12} = \frac{\sqrt{1/4}}{y}$ oe

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Question	Answer	Mark	Part marks
22 (a)	3	1	
(b)	$\frac{19}{27}$ oe	1	
(c)	$\frac{7}{10}$ oe	1	
(d)		1	
23	69.3 or 69.28...	4	M2 for height = $\sqrt{8^2 - 4^2}$ or M1 for $4^2 + h^2 = 8^2$ oe and M1 for $\frac{1}{2}(8+12) \times \text{their perp height}$ oe
24 (a)	$(a+2)(2+p)$ final answer	2	B1 for $2(a+2) + p(a+2)$ or $a(2+p) + 2(2+p)$
(b)	$2(9+2t)(9-2t)$ oe	2	B1 for $2(81-4t^2)$ oe or $(18+4t)(9-2t)$ oe If 0 scored SC1 for $(9+2t)(9-2t)$ final answer
25	$y = -\frac{3}{7}x + 11$ oe	6	B2 for gradient = $-\frac{3}{7}$ or M1 for [gradient =] $\frac{15-1}{10-4}$ oe or for the negative reciprocal of <i>their</i> gradient and B2 for [midpoint of AB =] (7, 8) or B1 for (7, k) or (k, 8) and M1 for substitution of <i>their</i> midpoint or (4, 1) or (10, 15) into a linear equation

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Question	Answer	Mark	Part marks
26 (a)	20.1 or 20.07 to 20.08	2	M1 for $\frac{1}{2} \times 7 \times 10 \times \sin 35$ oe
(b)	5.86 or 5.858.....	4	M2 for $7^2 + 10^2 - 2 \times 7 \times 10 \times \cos 35$ A1 for 34.3 .. or M1 for $\cos 35 = \frac{7^2 + 10^2 - AC^2}{2 \times 7 \times 10}$