



**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.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2016 series for most Cambridge IGCSE<sup>®</sup>, Cambridge International A and AS Level components and some Cambridge O Level components.

© IGCSE is the registered trademark of Cambridge International Examinations.

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

---

This document consists of **5** printed pages.

<b>Page 2</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge IGCSE – May/June 2016</b>	<b>0580</b>	<b>21</b>

### Abbreviations

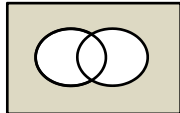
cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfww	not from wrong working
soi	seen or implied

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

<b>Page 3</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge IGCSE – May/June 2016</b>	<b>0580</b>	<b>21</b>

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

<b>Page 4</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge IGCSE – May/June 2016</b>	<b>0580</b>	<b>21</b>

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

<b>Page 5</b>	<b>Mark Scheme</b>	<b>Syllabus</b>	<b>Paper</b>
	<b>Cambridge IGCSE – May/June 2016</b>	<b>0580</b>	<b>21</b>

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