

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2015 series

0580 MATHEMATICS

0580/21

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.

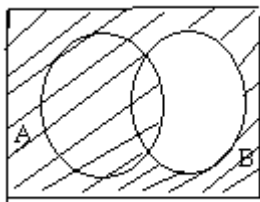
Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2015 series for most Cambridge IGCSE[®], Cambridge International A and AS Level components and some Cambridge O Level components.

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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	[+]17	1	
2		1	
3	Triangle (3, -2), (4, -2), (4, -1)	2	B1 for movement 2 right or 3 down
4	628	2	M1 for $\frac{785}{1+4}$ [x 4]
5	7 nfw	2	M1 for 7.5×8 or for $(7 + 8 + 8 + y + 6 + 9 + 10 + 5) \div 8 = 7.5$ or better oe
6	$\frac{\sqrt{4} \times 30}{9 - 3}$ 10 nfw	M1 A1	Allow one error and 2 for $\sqrt{4}$ and 6 for $9 - 3$
7	18	2	M1 for $36 = 2 \times 2 \times 3 \times 3$ soi or $90 = 2 \times 3 \times 3 \times 5$ soi or listing the correct factors of 36 and 90 showing a minimum of 2, 3, 6, 9 and 18
8 (a)	90	1	
(b)	8.29 or 8.289... to 8.29	2	M1 for $\frac{OP}{11} = \tan 37^\circ$ oe

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9	(a) $(a + 3c)(x + y)$ final answer	2	B1 for $a(x + y) + 3c(x + y)$ or $x(a + 3c) + y(a + 3c)$
	(b) $3(a - 2b)(a + 2b)$ final answer	3	B2 for $3(a - 2b)(a + 2b)$ seen and then spoiled or $(3a - 6b)(a + 2b)$ or $(a - 2b)(3a + 6b)$ or $(a - 2b)(a + 2b)$ or B1 for $3(a^2 - 4b^2)$
10	$\frac{14}{90}$ oe must be fraction	2	M1 for $15.5 - 1.5$ oe or B1 for $\frac{k}{90}$
11	31.4 or 31.36 to 31.37	3	M2 for $\left[\frac{2}{2} \times\right] 6.1 \times \pi + 2 \times 6.1$ oe or B2 for 19.16 to 19.17 or 19.2 or M1 for $6.1 \times \pi$ or for $12.2 \times \pi$
12	81	3	M1 for $V = k(r + 1)^3$ and A1 for $k = 3$ or M2 for $\frac{V}{24} = \frac{3^3}{2^3}$ oe
13	$\left[\pm\right] \sqrt{\frac{y-b}{a}}$ oe final answer	3	M1 for correctly subtracting to isolate term in x^2 M1 for correct division M1 for the final stage of correctly finding the square root
14	19 nfw	4	B3 19.3 or 19.28 to 19.29 or M2 for $\frac{300 \times 60^2}{56 \times 1000}$ oe or M1 for distance divided by speed e.g. <i>their</i> $300 \div \textit{their} 56$ or $\frac{56 \times 1000}{60^2}$ If B0 then B1 for seeing their answer in decimal form correctly written to the nearest integer

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15	$\frac{x+4}{x+1}$ final answer	4	<p>B1 for $(x-4)(x+4)$ and B2 for $(x-4)(x+1)$ or SC1 for $(x+a)(x+b)$ where $a+b = -3$ or $ab = -4$</p>	
16	198	4	<p>B3 for 197.7.... or answer 198.00 or M2 for $1800 \times \left(1 + \frac{1.5}{100}\right)^7 - 1800$ or B2 for answer 1998 or M1 for $1800 \times \left(1 + \frac{1.5}{100}\right)^7$ If B0 then B1 for seeing their answer in decimal form correctly written to the nearest integer</p>	
17 (a)	Enlargement $\frac{1}{2}$ origin oe	1 1 1	<p>correct or FT <i>their</i> (a) allow for 2 marks $\begin{pmatrix} k & 0 \\ 0 & k \end{pmatrix}$ where $k = \text{their scale factor in (a)}$ B1 for one correct row or correct column or $\begin{pmatrix} k & 0 \\ 0 & k \end{pmatrix}$ ($k \neq 0$ or 1)</p>	
(b)	$\begin{pmatrix} \frac{1}{2} & 0 \\ 0 & \frac{1}{2} \end{pmatrix}$ oe	2FT		
18 (a)	$\begin{pmatrix} -9 & -5 \\ -7 & -5 \end{pmatrix}$	2	B1 for two correct elements	
(b)	$\frac{1}{10} \begin{pmatrix} 4 & 2 \\ -3 & 1 \end{pmatrix}$ oe	2	B1 for $\frac{1}{10} \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ or $k \begin{pmatrix} 4 & 2 \\ -3 & 1 \end{pmatrix}$ seen or det = 10 soi	
(c)	Not the same order oe	1		

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19	281 or 280.8 to 280.9...	5	<p>M2 for $\frac{25}{360} \times 2 \times \pi \times 15 \times 5$ oe</p> <p>or</p> <p>M1 for $\frac{25}{360} \times 2 \times \pi \times 15$ oe</p> <p>and</p> <p>M1 for $[2] \times \frac{25}{360} \times \pi \times 15^2$ oe</p> <p>and</p> <p>B1 for $15 \times 5 [\times 2]$</p>
20 (a)	0.16 oe	2	<p>M1 for 0.4×0.4</p> <p>If zero scored SC1 for fully correct evaluated method involving a without replacement method</p>
(b)	0.58 oe	4	<p>M3 for $1 - (0.4^2 + 0.5^2 + 0.1^2)$ oe</p> <p>or</p> <p>M2 for $0.4^2 + 0.5^2 + 0.1^2$</p> <p>ALT method</p> <p>M3 for</p> <p>$0.4 \times (0.5 + 0.1) + 0.5 \times (0.4 + 0.1) + 0.1 \times (0.4 + 0.5)$ oe</p> <p>or</p> <p>M2 for addition of any three of:</p> <p>$0.4 \times 0.5, 0.4 \times 0.1, 0.5 \times 0.4, 0.5 \times 0.1, 0.1 \times 0.4$</p> <p>and 0.1×0.5</p> <p>or</p> <p>M1 for addition of any two of:</p> <p>$0.4 \times 0.5, 0.4 \times 0.1, 0.5 \times 0.4, 0.5 \times 0.1, 0.1 \times 0.4$</p> <p>and 0.1×0.5</p> <p>If zero scored SC2 for fully correct evaluated method involving a without replacement method</p>
21 (a)	512	2	<p>B1 for $[f(2) =] 8$</p> <p>or</p> <p>M1 for $(x^3)^3$ or better</p>
(b)	$6x - 2$ or $2(3x - 1)$ final answer	2	B1 for $3(2x + 1) - 5$ or better
(c)	$\frac{1}{2}(x - 1)$ oe	2	<p>M1 for correct first step</p> <p>eg $y - 1 = 2x$ or $\frac{y}{2} = x + \frac{1}{2}$</p> <p>or $x = 2y + 1$ or better</p>