

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge International General Certificate of Secondary Education

**MARK SCHEME for the October/November 2015 series**

**0580 MATHEMATICS**

**0580/22**

Paper 2 (Extended), maximum raw mark 70

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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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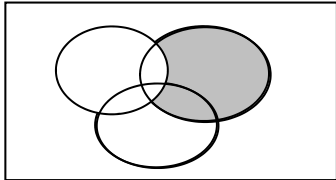
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**Abbreviations**

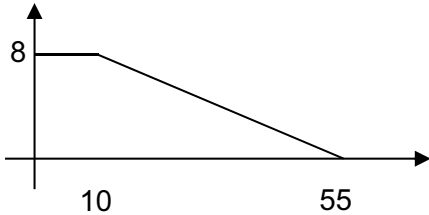
cao	correct answer only
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfww	not from wrong working
soi	seen or implied

Question	Answer	Mark	Part Marks
<b>1</b>	17	<b>1</b>	
<b>2</b>	Parallelogram	<b>1</b>	
<b>3</b>	694 or 694.4[4...]	<b>2</b>	<b>M1</b> for $950 \div 1.368$
<b>4</b>	5.83 or 5.830 to 5.831	<b>2</b>	<b>M1</b> for $\sqrt{(-3)^2 + 5^2}$
<b>5</b>	262 or 261.7 to 261.83...	<b>2</b>	<b>M1</b> for $\frac{1}{2} \times \frac{4}{3} \pi \times 5^3$ If zero scored <b>SC1</b> for final answer 524 or 523.5 to 523.7
<b>6 (a)</b>	18	<b>1</b>	
<b>(b)</b>		<b>1</b>	
<b>7</b>	$\begin{pmatrix} 11 & -8 \\ -6 & 8 \end{pmatrix}$	<b>2</b>	<b>B1</b> for two correct elements
<b>8</b>	3826 or 3826.38	<b>2</b>	<b>M1</b> for $8000 \times \left(1 - \frac{10}{100}\right)^7$ oe
<b>9</b>	0.3	<b>2</b>	<b>M1</b> for $\frac{k \times 50000 \times 50000}{100000 \times 100000}$ oe If zero scored <b>SC1</b> for figs 3
<b>10</b>	54	<b>3</b>	<b>M2</b> for $14.4 \times \frac{15}{4}$ oe or <b>M1</b> for $14.4 \div 4$ or $\frac{4}{15}$ associated with 14.4 If zero scored <b>SC1</b> for final answer 19.6[4]

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11	6.24 or 6.244 to 6.245	3	<b>M2</b> for $\sqrt{8^2 - 5^2}$ or <b>M1</b> for $8^2 = 5^2 + x^2$ or better
12	$2\frac{3}{12}$ or $1\frac{15}{12}$ or $\frac{27}{12}$ or $\frac{9 \times 3}{4 \times 3}$  <i>their</i> $(\frac{27}{12} - \frac{11}{12} = \frac{16}{12})$ oe  $1\frac{1}{3}$ or $\frac{4}{3}$ cao	<b>M1</b> <b>M1</b> <b>A1</b>	Accept any correct conversion with common denominator $12k$  Correct resolving of <i>their</i> subtraction with denominator $12k$ showing full working  Working and then simplified answer must both be seen
13	8.12 or 8.118...	3	<b>M2</b> for $\frac{12.4}{\sin 74} \times \sin 39$ or <b>M1</b> for implicit version $\frac{\sin 39}{y} = \frac{\sin 74}{12.4}$ oe
14	2500 nfw	3	<b>M2</b> for $2475 \div (1 - \frac{1}{100})$ oe or <b>M1</b> for 2475 associated with 99%
15 (a)	$(3w+10)(3w-10)$ final answer	1	
(b)	$(m+n)(p-6q)$ oe final answer	2	<b>B1</b> for $p(m+n) - 6q(m+n)$ oe or $m(p-6q) + n(p-6q)$ oe
16	36.8 or 36.80 to 36.81	3	<b>M1</b> for $\frac{26}{360} \times 2 \times \pi \times 15$ <b>M1</b> for $2 \times 15 +$ a term involving $\pi$
17	175	3	<b>M1</b> for $y = k(x-1)^2$ oe <b>A1</b> for $k = 7$ or <b>M2</b> for $\frac{63}{(4-1)^2} = \frac{y}{(6-1)^2}$ oe
18	16.2  16.6 nfw	3	<b>M1</b> for two of 2.35, 5.75, 2.45, 5.85 seen or $2 \times (5.8 - 0.05 + 2.4 - 0.05)$ or $2 \times (5.8 + 0.05 + 2.4 + 0.05)$ <b>A1</b> 16.2 or 16.6 in either answer space If zero scored <b>SC2</b> for both correct reversed answers provided 16.6 nfw

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<p><b>19</b></p>	$\sqrt{(-6)^2 - 4(5)(-3)}$ or better seen  if $\frac{p + \sqrt{q}}{r}$ or $\frac{p - \sqrt{q}}{r}$ seen then  $p = -(-6)$ and $r = 2 \times 5$  -0.38 1.58 cao final answers	<p><b>B1</b></p> <p><b>B1</b></p> <p><b>B1</b></p> <p><b>B1</b></p>	<p>If completing the square</p> <p><b>B1</b> for <math>\left(x - \frac{3}{5}\right)^2</math> oe</p> <p><b>B1</b> for <math>\frac{3}{5} + \sqrt{\frac{3}{5} + \left(\frac{3}{5}\right)^2}</math> or <math>\frac{3}{5} - \sqrt{\frac{3}{5} + \left(\frac{3}{5}\right)^2}</math> oe</p> <p>If B0, <b>SC1</b> for</p> <p><b>B1</b> - 0.4 and 1.6</p> <p>or - 0.379[795..] and 1.579[795..]</p> <p>or - 1.58 and 0.38</p> <p>as final answers</p> <p>or - 0.38 and 1.58 seen in working</p>
<p><b>20 (a)</b></p> <p><b>(b)</b></p>	 <p>260</p>	<p><b>B1</b></p> <p><b>B1</b></p> <p><b>3FT</b></p>	<p>line from (0, 8) to (10, 8)</p> <p>line from <i>their</i> (10, 8) to (55, 0)</p> <p><b>M2FT</b> for <math>8 \times 10 + 0.5 \times 8 \times 45</math> oe or for a fully correct area calculation for <i>their</i> graph</p> <p>or <b>M1FT</b> for <math>8 \times 10</math> or <math>0.5 \times 8 \times 45</math> or for one correct area calculation for <i>their</i> graph</p>
<p><b>21 (a)</b></p> <p><b>(b)</b></p>	<p>12</p> <p>12.8</p>	<p><b>2</b></p> <p><b>3</b></p>	<p><b>M1</b> for <math>\frac{7.2}{x} = \frac{15}{25}</math> oe or better eg <math>7.2 \times \frac{25}{15}</math></p> <p><b>M2</b> for <math>16 \times \sqrt[3]{\frac{192}{375}}</math> oe</p> <p>or</p> <p><b>M1</b> for <math>\sqrt[3]{\frac{192}{375}}</math> or <math>\sqrt[3]{\frac{375}{192}}</math> oe or <math>\left(\frac{16}{y}\right)^3 = \frac{375}{192}</math> oe</p>
<p><b>22 (a)</b></p> <p><b>(b)</b></p>	<p>3.5 nfw</p> <p>2 nfw</p>	<p><b>3</b></p> <p><b>3</b></p>	<p><b>M1</b> for <math>\Sigma fx</math> soi</p> <p><b>M1</b> (dep) for <math>\div 24</math></p> <p><b>M2FT</b> for <math>\frac{\text{their } 84 + x}{25} = 3.44</math> or better</p> <p>or <b>M1</b> for <math>25 \times 3.44</math></p>

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23 (a)	$\frac{8}{14}$ and $\frac{5}{13}$	1	
	$\frac{6}{13}$ and $\frac{7}{13}$	1	
	(b) (i) $\frac{30}{182}$ oe	2	<b>M1FT</b> for $\frac{6}{14} \times \textit{their} \frac{5}{13}$
	(ii) $\frac{126}{182}$ oe	3	<b>M2FT</b> for $1 - \frac{8}{14} \times \frac{7}{13}$ or $\frac{6}{14} \times \frac{5}{13} + \frac{6}{14} \times \frac{8}{13} + \frac{8}{14} \times \frac{6}{13}$ or $\frac{6}{14} + \frac{8}{14} \times \frac{6}{13}$ oe  or <b>M1FT</b> for sum of any two of $\frac{6}{14} \times \frac{5}{13}$ or $\frac{6}{14} \times \frac{8}{13}$ or $\frac{8}{14} \times \frac{6}{13}$