

**MARK SCHEME for the October/November 2010 question paper  
for the guidance of teachers**

**0580 MATHEMATICS**

**0580/22**

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 must be read in conjunction with the question papers and the report on the examination.

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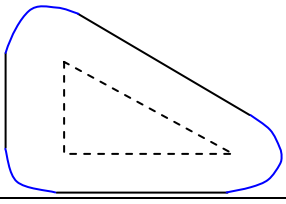
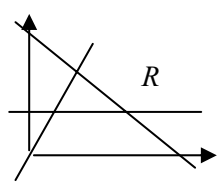
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### Abbreviations

cao	correct answer only
cso	correct solution only
dep	dependent
ft	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
www	without wrong working

Qu.	Answers	Mark	Part Marks
<b>1</b>	<b>(a)</b> 5	1	
	<b>(b)</b> 0	1	
<b>2</b>	10	2	<b>M1</b> 33 – 25 or 38 – 30 <b>M1</b> 30 – 15 – 5 oe with no further working
<b>3</b>	$m = \frac{J}{v - u}$	2	<b>M1</b> $m(v - u)$ seen
<b>4</b>	<b>(a)</b> 40	1	
	<b>(b)</b> 65	1	
<b>5</b>	23.6	2	<b>M1</b> $\sin R = 20/50$ or $\frac{20}{\sin R} = \frac{50}{\sin 90}$
<b>6</b>	<b>(a)</b> $6.58 \times 10^{-3}$	1	× and 10 essential
	<b>(b)</b> 0.00 <u>66</u> cao	1	Allow $6.6 \times 10^{-3}$
<b>7</b>	$t = 2\frac{1}{2}$	2	<b>M1</b> <b>(b)</b> $t = \mathbf{(b)}(3t - 5)$
<b>8</b>	Answer given so only working scores marks	2	<b>M1</b> 7/27 + 48/27 or 7/27 + (1)21/27 <b>M1</b> completely correct finish
<b>9</b>	2390 2410	2	<b>M1</b> 119.5 and 120.5 or <b>B1</b> for one correct answer
<b>10</b>	60	3	<b>B1</b> 540 used <b>M1</b> [their 540 – 3 × 140]/2
<b>11</b>	128	3	<b>M1</b> $R = kv^2$ <b>A1</b> $k = \frac{1}{2}$
<b>12</b>	$\frac{x - 7}{(x - 1)(x + 2)}$	3	<b>M1</b> $3(x - 1) - 2(x + 2)$ seen <b>B1</b> denominator correct seen <b>A1</b> all correct

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<b>13</b>	245 or 246	3	<b>M1</b> $\pi \times 5^2$ <b>M1</b> $18^2 - \text{their } k\pi$																				
<b>14</b>		3	<b>M1</b> 2 lines correct length <b>M1</b> 2 compass arcs correct length <b>A1</b> complete accurate drawing with all lines and arcs solid																				
<b>15</b>	36 cao	3	<b>M1</b> $1900/2.448 (= 776.14)$ <b>A1</b> “776.(14...)” – 740 (= 36.14...)																				
<b>16</b>	(a) $\frac{4}{9}x^8$  (b) $2y^{-1}$	2  2	<b>B1</b> $\frac{4}{9}$ <b>B1</b> $x^8$  <b>B1</b> 2 <b>B1</b> $y^{-1}$																				
<b>17</b>	(a) <table border="1" data-bbox="231 817 726 996"> <thead> <tr> <th></th> <th>Boys</th> <th>Girls</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Asia</td> <td>62</td> <td>28</td> <td><b>90</b></td> </tr> <tr> <td>Europe</td> <td>35</td> <td>45</td> <td><b>80</b></td> </tr> <tr> <td>Africa</td> <td><b>68</b></td> <td>17</td> <td><b>85</b></td> </tr> <tr> <td>Total</td> <td><b>165</b></td> <td><b>90</b></td> <td>255</td> </tr> </tbody> </table> (b) $\frac{3}{17}$ or 0.176(47...)		Boys	Girls	Total	Asia	62	28	<b>90</b>	Europe	35	45	<b>80</b>	Africa	<b>68</b>	17	<b>85</b>	Total	<b>165</b>	<b>90</b>	255	3  1	<b>B1</b> two or three correct or <b>B2</b> four or five correct  Allow $\frac{45}{255}, \frac{15}{85}, \frac{9}{51}$
	Boys	Girls	Total																				
Asia	62	28	<b>90</b>																				
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Total	<b>165</b>	<b>90</b>	255																				
<b>18</b>	(a) $\begin{pmatrix} -14 & 0 \\ 0 & -14 \end{pmatrix}$  (b) -14  (c) $\begin{pmatrix} -5 & 4 \\ 5 & -4 \end{pmatrix}$	2  1  2	<b>B1</b> two or three correct answers  <b>B1</b> two or three terms correct																				
<b>19</b>	(a) 14.1  (b) 3.74 or 3.78	2  3	<b>M1</b> $(BD^2) = 10^2 + 10^2$ or $\sin 45 = 10/CD$ <b>M1</b> (a)/2 <b>M1</b> (their (a)/2) <sup>2</sup> + $PM^2 = 8^2$																				
<b>20</b>	(a)   (b)	4  1	<b>B1</b> $y = 2$ <b>single</b> line thro <b>B1</b> (6, 0) and <b>B1</b> (0,6) <b>B1</b> $y = 2x$  Correct <i>R</i> cao																				

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<b>21</b>	<b>(a)</b> 2	1	<b>M1</b> intention to find area under the graph <b>M1</b> $\frac{1}{2} \times 7 \times 14 + 9 \times 14 + \frac{1}{2} \times 4 \times 14$ oe
	<b>(b)</b> 6.7 to 7.3	1	
	<b>(c)</b> 203	3	
<b>22</b>	<b>(a)</b> (0, 7)	1	<b>B1</b> $y = 2x + c, c \neq 7$ or <b>B1</b> $y = kx + 3, k \neq 0$ <b>B1</b> $y = 5$ <b>M1</b> $\left(\frac{0+2}{2}, \frac{3+5}{2}\right)$ <b>A1</b> (1, 4)
	<b>(b) (i)</b> $y = 2x + 3$	2	
	<b>(b) (ii)</b> (1, 4)	3	