

**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.

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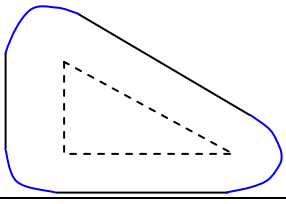
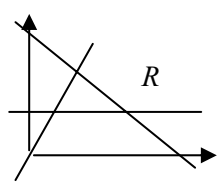


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Abbreviations

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

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

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