

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

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.

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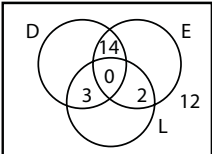
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Abbreviations

- 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	20 (but 3, 4 and 8 must be seen www)	2	M1 3, 4 and 8 seen www
2	1.2496 cao	2	Allow $1 \frac{156}{625}$ M1 $1 + 0.2 + 0.04 + 0.008 + 0.0016$
3	2	2	M1 $3x - 1 - 3x + 3$
4	0.9^3 0.9^2 $\sqrt{0.9}$ $\sqrt[3]{0.9}$	2	M1 0.94(8683...) 0.96(5489....) 0.8(1) 0.7(29)
5	(a) 5 (b) 2	1 1	
6	$1.15(2) \times 10^{-2}$	2	M1 figs 115(2)
7	$\frac{5+x}{2x}$	2	M1 $4 + 1 + x$ seen or M1 $\frac{10+2x}{4x}$ oe
8	40.5	2	M1 6.75 seen or $6 \times$ their LB
9	\$674.92, 674.9(0) or 675	3	M2 $600 \times (1 + (4/100))^3$ or better oe or M1 600×1.04^2 oe
10	$x = 4$ $y = -3$	3	M1 consistent mult and sub/add A1 one correct value but M must be scored
11		3	Marks allocated for R in one of the regions shown
12	$x = +/- \sqrt{(5y) - 3}$ or $x = +/- \sqrt{5y} - 3$	3	M1 correct move of the 5 completed M1 correct move of the square completed M1 correct move of the 3 completed

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13	$x < -3$	3	M1 correct move M1 correct move M1 correct move
14	(a) 10(.0) (b) $2\frac{1}{2}$, 2.5(0)	1 2	M1 $2n - 3 = 2$
15	31.4 cao	3	M1 $\frac{1}{2} \times 2 \times \pi \times 3$ oe M1 $6 + 8 + 6 + 1 + 1 + k\pi$
16	$\frac{x-3}{x+2}$	4	B2 $(x-3)(x-2)$ or B1 $(x+a)(x+b)$ where $ab = 6$ or $a + b = -5$ B1 $(x-2)(x+2)$
17	(a) $\begin{pmatrix} 8 & 0 \\ 0 & 8 \end{pmatrix}$ oe (b) $\begin{pmatrix} \frac{1}{4} & \frac{1}{4} \\ \frac{1}{4} & -\frac{1}{4} \end{pmatrix}$ oe	2 2	B1 for one column (or row) correct B1 for $-1/8 \begin{pmatrix} a & c \\ b & d \end{pmatrix}$ or B1 for $\begin{pmatrix} -2 & -2 \\ -2 & 2 \end{pmatrix}$ seen
18	(a) (i) Tangent (ii) 4.4 to 6 (b) 780	1 2 2	Correct tangent drawn dep M1 attempting to find gradient of their tangent M1 evidence of finding the area under the graph ONLY from $t = 12$ to $t = 25$
19	(a) 20200 (b) 1260	2 2	M1 $65 \times 300 + 700$ M1 71190 / 56.5
20	$x = 0.84$ or 7.16	4	B1 $\frac{8 \pm k}{2}$ B1 $\sqrt{8^2 - 4 \times 1 \times 6}$ or better A1 A1
21	(a) Bisector (b) (4, 2) (c) $y = -2x + 10$ oe	2 1 3	B1 accurate line B1 two sets of correct arcs B1 correct m B1 correct c M1 correct use of $y = mx + c$ oe on answer line
22	(a)  (b) 11 (c) 23	4 1ft 1ft	B1 0 and 14 in correct place B1 2 in correct place B1 3 in correct place B1 12 in correct place B1ft 8 + their 3 B1ft 21 + their 2