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.

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

- CIE will not enter into discussions or correspondence in connection with these mark schemes.
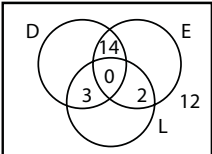
Abbreviations

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	1	
	(b) 2	1	
6	$1.15(2) \times 10^{-2}$	2	**M1** figs 115(2)
7	$\dfrac{5 + x}{2x}$	2	**M1** $4 + 1 + x$ seen or **M1** $\dfrac{10 + 2x}{4x}$ oe
8	40.5	2	**M1** 6.75 seen or 6 × 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

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	$\dfrac{x-3}{x+2}$	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** $\dfrac{8 \pm k}{2}$ **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 **B1**ft 8 + their 3 **B1**ft 21 + their 2