

**MARK SCHEME for the May/June 2010 question paper**  
**for the guidance of teachers**

**0580 MATHEMATICS**

**0580/21**

Paper 21 (Extended), maximum raw mark 70

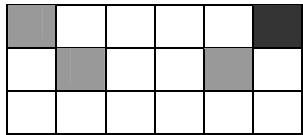
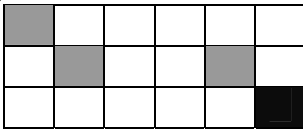
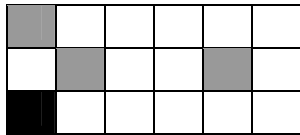
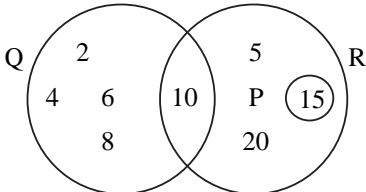
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Mark schemes must be read in conjunction with the question papers and the report on the examination.

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Qu.	Answers	Mark	Part Marks
1	3.14 $\pi$ $\frac{22}{7}$ $\sqrt{10}$	2	<b>M1</b> 3.1428(...) and 3.16(2...) seen
2	650	2	<b>M1</b> $\frac{600}{2.4}$ ( $\times 2.6$ )
3	44	2	<b>M1</b> 97 or 53 seen
4	30	2	<b>M1</b> $108 \times 1000 / (60 \times 60)$
5	$3.2(0) \times 10^4$	2	<b>B1</b> 32000 or $32 \times 10^3$ etc
6	(a) 0.461939(...) (b) 0.4619 or ft	1 1ft	
7	1.62	3	<b>M1</b> $\frac{1}{4} \pi 0.8^2$ <b>M1</b> adding $(0.8 \times 1.4)$ to their $k \pi$
8	(a) (i)  (ii)  (b) 2	1 1 1	or 
9	Sunday (May) 25 1045	1, 1, 1	Independent
10	24.3(0788...)	3	<b>M1</b> $5 \times 3.5 + 2 \times 1.5$ <b>M1</b> $(\sqrt{\quad}) 1.5^2 + 3.5^2$
11	$\frac{2cw - 4w}{5}$ oe	3	<b>M1</b> one correct move to clear fractions <b>M1</b> second correct move to subtract term <b>M1</b> third correct move dividing by 5 May be in any order
12		3	<b>M1</b> 15 only in small circle <b>M1</b> 10 only in the intersection <b>A1</b> all correct including labels
13	$x = 12$ $y = -10$	3	<b>M1</b> consistent addition (& mult) for $x$ or consistent subtraction (& mult) for $y$ <b>A1</b> only earned if method correct
14	3.84 or $3\frac{21}{25}$	3	<b>M1</b> $y = \frac{k}{x^2}$ oe <b>A1</b> $k = 96$

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15	(a) 4	1	
	(b) $y = -2x + 9$ oe	3	<b>M1</b> $\frac{5-3}{2-3}$ oe <b>M1</b> substitution of a point into their equation If <b>M1</b> only then <b>A1ft</b> for $y = "m"x + "c"$ used correctly with their numeric values
16	(a) $\frac{p^3}{8}$ or $0.125p^3$	1, 1	Independent marks for letter and no.
	(b) $\frac{9}{8}q^{-1}$	1, 1	Independent marks for letter and no. Allow $1\frac{1}{8}q^{-1}$ or $\frac{9}{8q}$
17	(a) 52	1	
	(b) 64	1	
	(c) 71	2	<b>M1</b> angle CED = 19
18	(a) E, G	1, 1	
	(b) A, B	1, 1	
19	(a) 2p 3p + q ..... 5p + 3q cao	1, 1, 1	
	(b) (i) all 4 plotted correctly ft	2	<b>B1</b> 2 or 3 correct
	(ii) a (straight) line	1	Allow linear, collinear
20	(a) 27	2	<b>M1</b> $g(-1) = 4$ seen or $((x-1)^2 - 1)^3$
	(b) $9x^2$ cao	2	<b>M1</b> $(3x + 1 - 1)^2$ or better
	(c) $\sqrt[3]{x+1}$	2	<b>M1</b> interchange x, y & rearrange formula
21	(a) CB and BA cao	1, 1	Independent
	(b) $\begin{pmatrix} 8 & -24 \\ -4 & 16 \end{pmatrix}$ cao	3	<b>M1</b> $\frac{1}{2} \times \frac{1}{4} - \frac{3}{4} \times \frac{1}{8} (= \frac{1}{32})$ <b>M1</b> $\begin{pmatrix} \frac{1}{4} & -\frac{3}{4} \\ -\frac{1}{8} & \frac{1}{2} \end{pmatrix}$ seen
	(c) determinant is zero	1	Allow cannot divide by zero