

**MARK SCHEME for the May/June 2011 question paper
for the guidance of teachers**

0580 MATHEMATICS

0580/31

Paper 3 (Core), maximum raw mark 104

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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 Mark
1	(a) 342.63	2	M1 for $500 \div 1.4593$
	(b) 280	3	M1 for $2 \times 62 + 3 \times 52$ B1 for 124 or 156 seen
	(c) 71.4 or 71.42 to 71.43	1ft	
	(d) 4.12	2	B1 for 6×0.98 seen B1 for 5.88 or $4 + 6 \times 0.02$
	(e) correct working	1	$50 \times 2.54 = 127$ oe or $130 \div 2.54 = 51.2$ or better
2	(a) (triangular) prism	1	
	(b) 49.6 to 50.4	1	
	(c) (i) 6	2	M1 for $\frac{1}{2} \times 4 \times 3$ oe
	(ii) 42	2ft	M1 for their (c)(i) $\times 7$
	(d) 3.5	2ft	M1 for their (c)(ii) $\div (3 \times 4)$ oe
3	(a) (i) 10	2	M1 $3 \times 2 - -4$ or better
	(ii) 8	3	M1 for $19 = 3m - 5$ oe M1 for $m = (19 + 5) \div 3$ oe
	(b) $7fg - g^3$	2	B1 for $7fg$ or B1 for $-g^3$
	(c) $6h(3h - 2j)$	2	B1 for partial factorisation $2(9h^2 - 6hj)$ or $3(6h^2 - 4hj)$ or $h(18h - 12j)$ or $6(3h^2 - 2hj)$ or $3h(6h - 4j)$ or $2h(9h - 6j)$ or B1 for $6h(ah - 2j)$ or $6h(3h - bj)$
	(d) $\frac{t-15}{8}$	2	M1 for correct first step or M1 for correct second step ft
	(e) 9	3	M1 for $3p - 15$ M1 for collecting their terms $2p = k$ or $kp = 18$

4	(a) (i)	1	1	
	(ii)	15	1	
	(iii)	10	1	
	(b) (i)	3	1	
	(ii)	24	2	M1 for $4 \div 10 \times 60$ or M1 for $4 \div \frac{1}{6}, 4 \times 6,$ $(4 \times 60)/10$ oe
	(iii)	6.67 or 6.66(6...)	3	M1 for dist = 5 and time = 45 seen M1 for $5 \div 45 \times 60$ oe
(c)	horizontal line to (105, 5) line from (their 105, 5) to (10 + their 105, 0)	1 1ft		
5	(a) (i)	2	2	M1 for numbers representing change in y / change in x Implied by $2k/k$
	(ii)	$2x + 1$	2ft	M1 for {their (a)(i)} $x + j$ or $kx + 1$ (j, k not equal to 0)
	(b) (i)	2 -2 2	2	B1 for 2 correct
	(ii)	7 points correct smooth curve	3 ft 1	B2 for 5 or 6 points correct B1 for 3 or 4 points correct Must be close to parabolic in shape
	(iii)	-1.5 to -1.3 cao 1.3 to 1.5 cao	1 1	
	(c)	(-1, -1) and (3, 7) cao	1, 1	

6	(a) (i)	144	1	
	(ii)	125	1	
	(iii)	103	1	
	(iv)	159	1	
	(b)	$2^3 \times 11$ or $2 \times 2 \times 2 \times 11$	2	SC1 for 2 and 11 seen, no extras or SC1 for $2 \times 4 \times 11$
	(c)	24	2	SC1 for at least one of 2, 3, 4, 6, 8 or 12 or SC1 for $72 = 3 \times 24$ and $96 = 4 \times 24$
	(d)	60	2	SC1 for $60k$ or SC1 $2 \times 2 \times 3 \times 5$ oe
7	(a) (i)	correct reflection	1	
	(ii)	correct rotation	2	SC1 for rotation 90° anti-clockwise or 90° clockwise about any other point
	(b) (i)	enlargement sf 2 about origin	1 1 1	independent marks
	(ii)	translation by $\begin{pmatrix} 3 \\ 5 \end{pmatrix}$	1 1	independent marks
	(a)	frequencies 5, 3, 3, 0, 2	3	B2 for 4 correct, B1 for 3 correct If frequencies blank then SC2 for all tallies correct, SC1 for 3
8	(b) (i)	9	1	
	(ii)	3	1ft	
	(iii)	5	2	M1 clear attempt to find middle
	(iv)	4.8	3	M1 for Σ their $f \times x$ implied by 144 – clear attempt M1 dep for dividing by 30 isw
	(c) (i)	$\frac{3}{30}$ oe	1	
	(ii)	0	1	allow 0/30 only, accept zero, none, impossible
	(iii)	$\frac{17}{30}$ oe	1	accept 0.566 to 0.567 isw

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9	(a)	correct triangle with arcs	2	B1 without arcs or SC1 correct mirror image with arcs	
	(b)	68° to 71°	1ft		
	(c)	(i)	perpendicular bisector with 2 pairs of arcs	2	SC1 if accurate without arcs or accurate arcs with no line or accurate with arcs of <i>AB</i> or <i>AC</i>
		(ii)	3 to 3.4 cm	1ft	for their <i>P</i> on their bisector
	(d)	arc centre their <i>A</i> radius 5 cm	1ft	minimum must cut their <i>AB</i> and <i>AC</i>	
(e)	shading inside arc and to left of perpendicular bisector	2	SC1 for either condition met		
10	(a)	(i)	95.8 or 95.83 to 95.84	2	M1 for $120 \times \sin 53$ or $\sin 53 = \frac{x}{120}$ oe
		(ii)	233°	1cao	
	(b)	(i)	20.6° or 20.55 to 20.56	2	M1 for $\tan = \frac{9}{24}$ oe
		(ii)	17.9	3	M2 for $\sqrt{20^2 - 9^2}$ or M1 for $x^2 + 9^2 = 20^2$ oe