

**MARK SCHEME for the May/June 2012 question paper  
for the guidance of teachers**

**0580 MATHEMATICS**

**0580/32**

Paper 3 (Core), maximum raw mark 104

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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### 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
soi	seen or implied

Qu.	Answers	Mark	Part Mark
<b>1 (a)</b>	(\$) 15 000	<b>1</b>	
<b>(b)</b>	(\$) 500 000	<b>2ft</b>	<b>M1</b> for their $15\,000 \div 3 \times 100$
<b>(c)</b>	35	<b>2</b>	<b>M1</b> for $84 \div (3 + 5 + 4)$ or $84 \div 12$
<b>(d)</b>	40.32 or 40.3	<b>2</b>	<b>M1</b> for $4.5 \times 3.2 \times 2.8$
<b>(e) (i)</b>	(\$) 372 000	<b>1</b>	
<b>(ii)</b>	(\$) 200 000	<b>2ft</b>	<b>M1</b> for $992\,000 - (\text{their (e)(i)} + 420\,000)$
<b>(iii)</b>	42.3 cao	<b>2</b>	<b>M1</b> for $420\,000 \div 992\,000 \times 100$ or better
<b>(f)</b>	(\$) 4130	<b>3</b>	<b>M1</b> for $3500 \times 3 \times 6 \div 100$ oe <b>A1</b> for 630 soi After <b>M1A0</b> then <b>SCB1</b> for their $630 + 3500$
<b>2 (a) (i)</b>	Reflection $y = -1$	<b>1</b> <b>1</b>	
<b>(ii)</b>	Rotation 180 or $\frac{1}{2}$ turn (centre) (0, 0) or O or origin	<b>1</b> <b>1</b> <b>1</b>	
<b>(iii)</b>	Translation $\begin{pmatrix} 7 \\ -9 \end{pmatrix}$	<b>1</b> <b>1</b>	
<b>(b)</b>	Enlargement scale factor 0.5 drawn at the correct position.	<b>2</b>	<b>B1</b> for 0.5 enlargement at incorrect position.
<b>3 (a) (i)</b>	27	<b>1</b>	
<b>(ii)</b>	16	<b>1</b>	
<b>(iii)</b>	17	<b>1</b>	
<b>(b) (i)</b>	9, 16, 25, 36	<b>2</b>	<b>B1</b> for 3 correct or either 3 or 4 correct with other values, or all of $3^2, 4^2, 5^2, 6^2$

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(ii)	4 from 1, 2, 4, 19, 38, 76	2	B1 if 3 correct none wrong or 4 correct and 1 wrong or 5 correct and 1 wrong or 6 correct and 1 wrong
(iii)	5 or 7	1	
(iv)	24	2	B1 for any other multiple of 24
(v)	14	2	B1 for answer of 7 or $2 \times 7$
4 (a) (i)	-2, -2.5, -10 5, 2.5, 1.25	2	B1 for 4 or 5 correct
(ii)	10 points correctly plotted	3ft	B2ft for 8 or 9 points correctly plotted. B1ft for 6 or 7 points correctly plotted
	Smooth curve	1	
(b) (i)	Ruled line through both given points	2	B1 for not ruled but otherwise correct or through just 1 of the points
(ii)	(-2.5, -4), (2, 5)	2ft	B1 for 1 correct. ft their line and their curve.
(c) (i)	2 cao	2	M1 for change in $y$ / change in $x$ for 2 correct points
(ii)	( $y =$ ) $2x + 1$	1ft	Ft ( $y =$ ) their (c)(i) $x$ + intercept of their line in (b)(i)
5 (a)	82.5	2	M1 for $\frac{1}{2}(9.6 + 12.4) \times 7.5$ or better
(b) (i)	$x^3 - 3xy$ final ans	2	B1 for $x^3$ or $-3xy$ seen
(ii)	$13w - 22$ final ans	2	B1 for $13w$ or $-22$ or $8w - 12$ or $5w - 10$ seen
(c) (i)	( $p =$ ) $3x + 4y$ final ans	2	B1 for $3x$ or $4y$ seen or $x + 2x + y + 3y$ seen
(ii)	( $y =$ ) $\frac{p-3x}{4}$ oe	2ft	B1ft for $4y = p - 3x$ or $\frac{p}{4} = \frac{3x}{4} + y$
(d) (i)	$2(n + 5) = 3n + 5$ oe	2	B1 for $2(n + 5)$ or $2n + 10$ or $3n + 5$ seen or B1 for any different letter to $n$ in $2(n + 5) = 3n + 5$ oe
(ii)	( $n =$ ) 5 cao	3	M1 for clearing bracket M1 for $an = b$
6 (a) (i)	2, 3, 6, 5, 4, 3, 1	2	B1 for 4 correct or a fully correct tally
(ii)	97	1ft	Ft their table
(iii)	98	2ft	M1 for clear recognition of 12 <sup>th</sup> / 13 <sup>th</sup> value used

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(iv)	104	3	<b>M1</b> for clear attempt at finding total hours (implied by 2496) <b>M1</b> independent for division by 24 but not $\frac{7}{24}$ nor $\frac{835}{24}$ nor $\frac{24}{24}$
(v)	Median, extreme value	1	Any correct statement referring to the size of the 250 value
(b)	$\frac{13}{24}$ or 0.5416 to 0.542 isw	2ft	<b>M1</b> for addition of their frequencies of 98 and above
7 (a)	153 to 157	1	
(b)	Bisector of $AB$ with two sets of arcs	2	<b>B1</b> for 'correct' line without full sets of arcs
(c) (i)	Line at $020^\circ$	1	
(ii)	550 to 590	2ft	<b>B1ft</b> for 5.5 cm to 5.9 cm seen
(d)	447	2	<b>M1</b> for $1230 \div 2.75$ (or 165 or 2.45)
8 (a)	Isosceles	1	
(b) (i)	Correct triangle with one set of arcs	2	<b>B1</b> 'correct' triangle without arcs or a triangle with 1 side correct with arcs
(ii)	15 cao	3	<b>B1</b> for their height <b>M1</b> for $0.5 \times$ their base $\times$ their height
(iii)	85	2ft	<b>M1</b> for $4 \times$ their (b)(ii) $+ 5 \times 5$
(iv)	46	2	<b>B1</b> for 26 or 20 or $4 \times 6.5$ or $4 \times 5$ seen
(c)	Correct net	3	<b>B1</b> for a rectangle or square surrounded by 4 triangles with bases on the sides of the rectangle or square <b>B1</b> for accurate square $ABCD$ <b>B1ft</b> (dep on first 2 marks) for accurate isosceles triangles using their height from (b)(i)
9 (a) (i)	Diagram 4 drawn	1	
(ii)	8, 10, 12	2	<b>B1</b> for 2 correct or follow through for Diagrams 4 and 5 as 2 more than the previous entry
(b)	$2n + 2$ oe	2	<b>B1</b> for $jn + 2$ ( $j \neq 0$ ) or $2n + k$
(c)	98	1ft	Only follow through a linear expression in (b)
(d)	15	2	<b>B1</b> for a correct diagram or the sequence 1, 3, 6, ... seen or $5 + 4 + 3 + 2 + 1$ seen