

MARK SCHEME for the October/November 2012 series

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.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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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	(a) (i) $94\,500 \div (7 + 6 + 5)$ or $94\,500 \div 18$ Multiply by 5	M1 M1dep	dependent on first mark
	(ii) 36 750	1	
	(b) (i) 3960	2	M1 for $0.5 \times (76 + 100) \times 45$ oe
	(ii) $\frac{3960}{26250}$ oe	1ft	Ft for $\frac{\text{their (b)(i)}}{26250}$ provided answer is integer/integer and less than 1
	(c) 83.3(3...)	1ft	Ft for $\frac{30625}{\text{their (a)(ii)}} \times 100$
	(d) (i) 10 9	1, 1	
	(ii) $1 - \frac{10}{24} - \frac{9}{24}$	M1ft	Accept $1 - 19/24$
	(iii) 45	1	
2	(a) (i) 2 -7 2	1,1,1	
	(ii) 12 correctly plotted points	3ft	P2ft for 10 or 11 correct. P1ft for 8 or 9 correct
	2 smooth curves through 12 correct points and correct shape	C1	
	Two separate branches not crossing the y-axis	B1	
	(iii) 2	1	
	(iv) 2.7 to 3.0, -3.0 to -2.7	1 1	

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	(b) (i) $\frac{1}{2}$ or 0.5 (ii) $-1 \quad 1 \quad 5$ (iii) Correct ruled continuous line drawn (c) (5.0 to 5.2, 3.5 to 3.7) (-3.2 to -3.0, -0.7 to -0.5)	1 2 1 1ft 1ft	B1 for 2 correct Ft ± 0.1 from their intersections
3	(a) Translation $\begin{pmatrix} -6 \\ -5 \end{pmatrix}$ (b) (i) Correct reflection (ii) Correct rotation (c) Points Q and R	1 1 1 2 1, 1	SC1 for 90° anti-clockwise about A or 90° clockwise about any other point.
4	(a) Parallelogram 0 Kite 1 Rhombus 2 Trapezium 0 (b) (i) Q or RQP or PQR (ii) 15	1,1 1,1 1,1 1,1 1 2	M1 for a complete correct method
5	(a) (i) Angle measured 80° $60 \div \text{their } 80^\circ \times 360^\circ$ oe (ii) (Blue) 47, 48 or 49 (Green) 56, 57 or 58 (b) (i) 52° (ii) Correct line drawn 52° Correct labels (c) (i) Bar chart with – vertical axis correctly scaled – bars of correct and equal width, – and with equal or no gaps (ii) 360	B1 M1 3 2 1ft 1ft 1 2 2	Or 2 for 1 correct or answers transposed Or B1 for $64^\circ \pm 1^\circ$ (blue) or $76^\circ \pm 1^\circ$ (Green) seen SC2 for 2 decimal answers in range M1 for $39 \div 270 \times 360$ oe Ft if <i>their</i> (b)(i) is less than 140° B1 for linear vertical scale to at least 40 shown B2 for all bars of correct heights and equal widths with equal or no gaps Or B1 for all bars of correct heights but unequal widths/gaps or at least 3 bars of correct heights and equal widths M1 for 9×40 or $40/100 \times 900$ oe

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6	(a) (i) (0)710	1	Accept (0)710 am
	(ii) 1 (h) 10 (min)	1	
	(b) Line from (08 20, 50) to (11 40, 142)	1	
	(c) Correct lines To (1200, 142) Then to (12 30, 162)	1ft	1ft for a horizontal line from their (11 40, 142) of length two small squares.
		2ft	2ft is for line from end of their horizontal line 3 small squares across and 10 small squares up. B1 for line from end of their horizontal line 10 small squares up or M1 for $40 \times 30 \div 60$ (implied by 20 kilometres seen)
	(d) 27	2	M1ft for their total distance $\div$ their time in hours SC1 for 36 or 24.9...
7	(e) (i) Line (10 10, their 142) to (13 20, 50)	2	B1 for one of (10 10, their 142) or (13 20, 50) plotted.
	(ii) 70 to 72 (km)	1ft	Ft is their intersection–50, half square accuracy.
	(a) Arc of circle 3.5 cm from <i>T</i> .	2	M1 for any arc, centre <i>T</i> .
	(b) (i) Correct construction with 4 correct arcs	2	B1 for correct but without 4 arcs
	(ii) Bisector of <i>QR</i> with 2 pairs of arcs.	2	B1 for correct but without 2 pairs of arcs
	(c) (i) <i>F</i> in correct region	1dep	Dependent on at least B1 and B1 in (b)

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	(ii) 1200 to 1700 (m ²)	4dep	Dependent on at least B1 and B1 in (b) If at least B1 and B1 in (b) then B1 for base $33 \leq b \leq 37$(m) or $3.3 \leq b \leq 3.7$(cm) B1 for height $70 \leq h \leq 96$(m) or $7.0 \leq h \leq 9.6$(cm) M1 for $\frac{1}{2} \times \text{their base} \times \text{their height}$ If B0 in either (b)(i) or (b)(ii) but <i>F</i> marked in any triangle SC1 for $\text{their base} \pm 2$(m) or ± 0.2(cm) SC1 for $\text{their perpendicular height} \pm 2$(m) or ± 0.2(cm) SC1 for $\frac{1}{2} \times \text{their base} \times \text{their height}$
8	(a) (i) Diagram 4 correctly drawn (ii) 17 22 27 (b) (i) $5n + 2$ oe final answer (ii) 147 (c) (i) 8 (ii) $4n - 4$ oe final answer (d) $n + 6$ cao	1 2 2 1ft 1 2 1	Clear intention B1 for 2 correct or a gap of 5 between Diagrams 3 and 4 and 4 and 5. B1 for $jn + 2$ ($j \neq 0$) or $5n + k$ Ft a linear expression B1 for $jn - 4$ ($j \neq 0$) or $4n + k$
9	(a) (i) $6d + 160 = 430$ oe (ii) 45 (iii) 184 or \$1.84 (b) (i) $3p + 2c = 92$ oe (ii) $2p + 5c = 153$ oe	1 2ft 2 1 2	Ft for $pd + q = r$ p, q and $r \neq 0$ and $p \neq 1$ M1ft for 1st step correct SC1 for 270 M1 for 1.15×160 oe SC1 for answer 1.84 Final answer B1 for $2p + 5c$ seen

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	(iii) ($p =$) 14 ($c =$) 25 cao	4	M2ft for correct method to eliminate 1 variable A1 for a correct answer If not M2 M1 for 2 equations with common coefficients of p or c seen or M1 for correct rearrangement to $p =$ or $c =$ seen
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