

## **MARK SCHEME for the October/November 2013 series**

### **0580 MATHEMATICS**

**0580/31**

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
<b>1</b>	<b>(a) (i)</b> 36 cao	<b>1</b>	
	<b>(ii)</b> 5, 2, 3, 4, 3, 8, 1, 4	<b>2</b>	<b>B1</b> for 6 or 7 frequencies correct or 8 correct tallies if frequency column blank or 8 correct frequencies in tally column
	<b>(iii)</b> fully correct bar chart	<b>3FT</b>	<b>B1</b> for a correct linear scaled frequency axis <b>B2FT</b> for correct height and equal width of bars or <b>B1FT</b> for correct height of at least 5 bars or all bars correct height but unequal widths or gaps <b>SC2</b> for a fully correct bar chart but linear scale not marked
	<b>(iv)</b> 26 – 30 cao	<b>1</b>	
	<b>(b)</b> 7 (hours) 25 ( minutes) cao	<b>1</b>	
	<b>(c) (i)</b> 238.48	<b>2</b>	<b>M1</b> for $167 \times 1.428$ soi by 238.47(6) or 238.5 or 238
	<b>(ii)</b> 75	<b>2</b>	<b>M1</b> for $107.1 \div 1.428$
<b>2</b>	<b>(a) (i)</b> 2, 3, 4, 5, 6, 8, 10, 12, 15, 20, 24, 30, 40, 60.	<b>1</b>	Award mark for any one from list.
	<b>(ii)</b> 60	<b>2</b>	<b>B1</b> for any common factor on answer line, 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30
	<b>(b) (i)</b> 60	<b>1</b>	
	<b>(ii)</b> 49	<b>1</b>	
	<b>(iii)</b> 2	<b>1</b>	
	<b>(c) (i)</b> Any correct example	<b>1</b>	Calculation and correct answer must be seen

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	(ii)	Any correct example	1	Calculation and correct answer must be seen
	(d) (i)	>	1	
	(ii)	>	1	
	(iii)	<	1	
3	(a) (i)	44 – 46	1	
	(ii)	231 – 235	1	
	(b) (i)	Fully correct drawing with arcs	3	<b>B2</b> for correct triangle without arcs <b>B1</b> for 1 correct length side Or arc of 6cm or 8cm
		52250 to 60500 <b>nfww</b>	3FT	<b>M2</b> for $\frac{1}{2} \times 550 \times$ ( <i>their</i> correct height $\times 50$ ) Or $\frac{1}{2} \times 11 \times$ <i>their</i> correct height in cm or <b>B1</b> for <i>their</i> correct height in cm or <i>their</i> correct height $\times 50$ seen  If 0 scored then <b>SC1</b> for $\frac{1}{2} \times 550 \times$ (50 $\times$ k)
4	(a) (i)	Translation $\begin{bmatrix} -7 \\ -8 \end{bmatrix}$	1  1	Accept 7 left and 8 down
	(ii)	Enlargement [Scale factor] 0.5 [Centre] (0, 0)	1 1 1	
	(b) (i)	D at (–2, 4) (–4, 4) (–3, 6)	1	
	(ii)	E at (–4, 2) (–4, 4) (–6, 3)	2	<b>B1</b> for correct orientation, incorrect centre or 90° rotation clockwise about (0,0).

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5	(a) (i)	230	2	M1 for $130 + 4 \times 25$ or better
	(ii)	252	2	M1 for $4n = 1138 - 130$ or better Or $(1138 - 130) / 4$ or better
	(b) (i)	9	1	
	(ii)	3.5	2	M1 for $8y = 24 + 4$ or better Or $y - 4/8 = 24/8$ or better
	(iii)	4	3	M1 for first correct step M1FT for second correct step
	(c)	$x = 1.5$ or $3/2$ $y = -5$	4	M1 for correctly equating one set of coefficients. M1 for correct method to eliminate one variable. A1 for $x = 1.5$ A1 for $y = -5$
6	(a)	252.56	2	M1 for $(30 + 30 + 17) \times 3.28$ or better oe
	(b) (i)	510	2	M1 for $30 \times 17$
	(ii)	170 102 136	3	M2 for 2 correct areas clearly identified or M1 for $408 \div (5 + 3 + 4)$ soi by 34 or one correct area clearly identified SC2 for three correct answers in incorrect places
	(c)	34.5	3	M2 for $\sqrt{30^2 + 17^2}$ soi by $\sqrt{1189}$ or M1 for $30^2 + 17^2$ soi by 1189
	(d) (i)	63.6 or 63.61 – 63.63	2	M1 for $4.5^2 \times \pi$ or $20.25 \pi$
	(ii)	127 or 127.2...	1FT	FT for <i>their</i> (d)(i) $\times 2$

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7	(a)	14, 4, 2, 8, 14	3	<b>B2</b> for 4 correct <b>B1</b> for 2 or 3 correct
	(b)	8 points correctly plotted	<b>P3FT</b>	<b>P2FT</b> for 6 or 7 points correctly plotted <b>P1FT</b> for 4 or 5 points correctly plotted
		Smooth and correct curve through all correct points	<b>C1</b>	
	(c)	$x = 0.5$ or $x = \frac{1}{2}$	1	
	(d) (i)	$y = 9$ ruled	1	
	(ii)	–2.15 to –2.25 3.15 to 3.25	<b>1FT</b> <b>1FT</b>	
8	(a) (i)	July or Jul	1	
	(ii)	10.9	1	
	(iii)	– 9.6	1	
	(b) (i)	$150 \div \frac{90}{360}$ oe	1	Accept $150 \times \frac{360}{90}$ , $150 \times 4$
	(ii)	250	3	<b>M1</b> for <i>their</i> $150/360 \times 600$ or <i>their</i> $150 \times 150/90$ and <b>B1</b> for 150 seen as angle
	(c)	11682	3	<b>M2</b> for $885 \times 15 \times 0.88$ oe <b>M1</b> for $885 \times 0.88$ oe or $885 \times 15 \times 0.12$ oe
	(d) (i)	$4.48 \times 10^6$ cao	1	
	(ii)	9.82	3	<b>M2</b> for $\frac{4920000 - 4480000}{4480000} \times 100$ oe or $\left(\frac{4920000}{4480000} - 1\right) \times 100$ oe or <b>B1</b> for 440000 or 0.44 or 1.098(....) or 109.8(....)

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9	(a) (i)	Chord Radius	1 1	
	(ii)	12 Tangent [meets] radius [at] 90 [°]	1 1	
	(iii)	66  Angles [in] triangle 180 <b>or</b> Angle [in a] semi-circle [= 90]	2 1	<b>M1</b> for BCD identified as 90 or 180–24–90
	(b) (i)	Octagon	1	
	(ii)	360 ÷ 8 [= 45]  (180 – <i>their</i> 45) ÷ 2	<b>M1</b>  <b>M1FT</b>	alternative method <b>M1</b> for (8–2) × 180 [=1080] or 6 × 180 [=1080]  <b>M1FT</b> for ( <i>their</i> 1080 ÷ 8) ÷ 2 or <i>their</i> 1080 ÷ 16
		67.5	<b>A1</b>	<b>A1</b> for 67.5
	(c)	15	2	<b>M1</b> for 360 / 24