

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

### **0580 MATHEMATICS**

**0580/33**

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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Page 2	Mark Scheme	Syllabus	Paper
	IGCSE – October/November 2013	0580	33

### 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.	Part	Answers	Mark	Part Marks
1	(a)	240      900 [Total] 1640	<b>1,1</b> <b>1FT</b>	500 + <i>their</i> 2 costs
	(b)	(i) $600 \div 5 \times 17$	<b>M2</b>	<b>M1</b> for $600 \div 5$ or $17 \div 5$
		(ii) 30	<b>2</b>	<b>M1</b> for $2040 \div 17 \times 3$ Or $120 \times 3$ , soi by 360
	(c)	43.1	<b>2</b>	<b>M1</b> for $\frac{2920 - 2040}{2040} \times 100$ oe or $(\frac{2920}{2040} - 1) \times 100$ oe or $\frac{2920}{2040} \times 100 - 100$ oe
2	(d)	261.36 cao	<b>3</b>	<b>M1</b> for $1500 \times 1.055^3$ oe  <b>M1FT</b> for <i>their</i> $1761.36 - 1500$ If only 1 scored <b>SC1</b> for correctly rounding to 2 decimal places from at least 3 decimal places  <b>SC2</b> if only 1761.36 seen
	(a)	Kite	<b>1</b>	
	(b)	(i) Rotation 90° clockwise (or 270° anti-clockwise) oe [centre] origin oe	<b>1</b> <b>1</b> <b>1</b>	
		(ii) Translation $\begin{pmatrix} -2 \\ -10 \end{pmatrix}$	<b>1</b> <b>1</b>	Accept 2 left and 10 down oe

Page 3	Mark Scheme	Syllabus	Paper
	IGCSE – October/November 2013	0580	33

		<p>(iii) Enlargement [Scale Factor] <math>-3</math> [centre] <math>(-3, 4)</math></p>	<p>1 1 1</p>	
	(c)	<p>(i) <math>[x^2 =] 3^2 + 1^2</math> <math>[x =] \sqrt{3^2} + 1^2</math> or <math>[x = \sqrt{9+1}]</math> or <math>\sqrt{10}</math> and <math>= 3.162\dots</math></p> <p>(ii) 9.15</p> <p>(iii) 27.45 to 27.5</p>	<p>M1 M1dep</p> <p>3</p> <p>1FT</p>	<p>M1 for <math>3^2 + 1^2</math> or better Needs a value to 3 or more decimal places</p> <p>B1 for <math>\sqrt{2}</math> or 1.41 or better seen M1 for <math>2 \times 3.16 + 2 \times \text{their } 1.41\dots</math> soi by 9.14 If zero scored SC1 if answer in range 8.6 to 9.6</p> <p>their (c)(ii) <math>\times 3</math></p>
3	(a)	<p>(i) 28</p> <p>(ii) 25 or 49 or 9 or 1</p> <p>(iii) 2</p> <p>(iv) 19 or 29</p>	<p>1 1 1 1</p>	
	(b)	<p>(i) 5</p> <p>(ii) 27</p>	<p>1 2</p>	<p>B1 for <math>\frac{1}{8}</math> or 216 seen</p>
4	(a)	<p>(i) 40</p> <p>(ii) 140</p>	<p>2 1FT</p>	<p>M1 for <math>360 \div 9</math></p> <p><math>180 - \text{their (a)(i)}</math></p>
	(b)	<p>(i) <math>[w =] 90</math></p> <p>(ii) <math>[x =] 24</math></p> <p>(iii) <math>[y =] 66</math></p>	<p>1 1 1FT</p>	<p><math>180 - (\text{their } w + \text{their } x)</math></p>
	(c)	<p><math>[z =] 66</math> [Angle between] tangent [and] diameter/radius [=] <math>90^\circ</math></p>	<p>1FT 1</p>	<p><math>(90 - \text{their } x)</math> or <math>\text{their } y</math></p>
5	(a)	<p>(i) 1, 7, 1</p> <p>(ii) 8 points correctly plotted</p> <p>Correct smooth curve through all 8 correct points</p>	<p>1, 1, 1</p> <p>P3FT C1</p>	<p>P2FT for 6 or 7 correct P1FT for 4 or 5 correct</p>

Page 4	Mark Scheme	Syllabus	Paper
	IGCSE – October/November 2013	0580	33

	(b)	–1.1 to –1.3 and 4.1 to 4.3	1FT, 1FT	
	(c)	(i) Line $x = 1.5$ drawn	1	
		(ii) $x = 1.5$ oe	1FT	Equation of <i>their</i> line in (c)(i)
	(d)	(i) Ruled continuous line drawn	1	
		(ii) 1	2	M1 for $\frac{\text{rise}}{\text{run}}$ for their line
		(iii) $[y =] x + 2$	1FT	<i>their</i> (d)(ii) + <i>their</i> 2
6	(a)	(i) 18	2	M1 for evidence of ordering
		(ii) 7	1	
		(iii) 25	2	M1 for sum of 15 items $\div$ 15 soi
	(b)	Alison with reference to [higher] mean and Bethan with reference to [higher] median	1FT 1FT	Strict FT Strict FT
	(c)	(i) [Frequencies] 3, 2, 1 [Angles] $72^\circ$ , $48^\circ$ , $24^\circ$	1 2	B1 for 1 correct or M1 for one frequency $\div$ 15 $\times$ 360 or $\times$ 24
		(ii) Two correct sectors on pie chart	2FT	B1FT for 1 correct sector Only ft if (c)(i) angles total 144
		3 'correct' labels	1	Independent
	(d)	$\frac{2}{5}$	2	B1 for 0.4 or 40% or $\frac{6}{15}$ or any equivalent fraction
7	(a)	[Angle DCE =] 36.9 or 36.8699 to 36.9	3	B1 for [DE =] 0.75 soi M1 for than $DCE = \frac{\text{their } DE}{1.0}$
	(b)	1.875 or 1.88	2	M1 for $0.5 \times (1.5 + 2.25) \times 1.0$ oe
	(c)	3.75	1FT	<i>their</i> (b) $\times$ 2

Page 5	Mark Scheme	Syllabus	Paper
	IGCSE – October/November 2013	0580	33

	(d)	3 rectangles and 1 trapezium correctly placed on the grid with correct scale and size.	4	<b>B1</b> for rectangle to right 6 by 8 squares <b>B1</b> for an accurate and correctly placed trapezium <b>B1</b> for a rectangle to left 9 by 8 squares <b>B1</b> for rectangle 5 by 8 squares and further to the left
8	(a)	Octagon	1	
	(b)	[Pattern 3] 20 and 22 [Pattern 4] 26, 29 [Pattern 7] 44, 50	1 1, 1 1, 1	
	(c)	(i) $6n + 2$ oe final answer (ii) 140 oe	2 1FT	<b>B1</b> for $6n + a$ or $bn + 2$ $b \neq 0$ ft linear expression in (c)(i)
	(d)	$7n + 1$ oe final answer	2	<b>B1</b> for $7n + c$ or $dn + 1$ $d \neq 0$
	(e)	$n - 1$ final answer	2FT	<b>B1FT</b> for $n + j$ or $kn - 1$ $k \neq 0$
9	(a)	(i) $[r =] \sqrt{\frac{3V}{\pi h}}$ (ii) $[r =] \sqrt{\frac{3 \times 141}{\pi \times 15}}$  [r =] 2.99...	2  M1FT  A1	<b>B1</b> for $[r^2 =] \frac{3V}{\pi}$ or $\frac{3V}{h}$ seen or better  their formula
	(b)	18.9 or 18.8 or 18.849 to 18.852	2	<b>M1</b> for $2 \times \pi \times 3$ oe
	(c)	1.9 [cents] cao	3	<b>M1</b> for $2,15$ (or $215$ ) $\div 113$ <b>A1</b> for $0.019$ (0...) or $1.9$ (0...) soi