

MARK SCHEME for the October/November 2013 series

0444 MATHEMATICS (US)

0444/33

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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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)	(i) 40	2	M1 for $360 \div 9$ 180 – <i>their</i> (a)(i)
		(ii) 140	1FT	
	(b)	(i) [w =] 90	1	180 – (<i>their</i> w + <i>their</i> x)
(ii) [x =] 24		1		
(iii) [y =] 66		1FT		
(c)	[z =] 66 [Angle between] tangent [and] diameter/radius [=] 90°	1FT 1	(90 – <i>their</i> x) or <i>their</i> y	
2	(a)	240 900 [Total] 1640	1, 1 1FT	500 + <i>their</i> 2 costs
	(b)	(i) $600 \div 5 \times 17$	M2	M1 for $600 \div 5$ or $17 \div 5$
		(ii) 30	2	M1 for $2040 \div 17 \times 3$ or 120×3 , soi by 360 or SC1 for <i>their</i> $360 \div 12$
	(c)	43.1	2	M1 for $\frac{2920 - 2040}{2040} \times 100$ oe or $\left(\frac{2920}{2040} - 1\right) \times 100$ oe or $\frac{2920}{2040} \times 100 - 100$ oe
(d)	261.36 cao	3	M1 for 1500×1.055^3 oe M1FT for <i>their</i> $1761.36 - 1500$ If only 1 scored SC1 for correctly rounding to 2 decimal places from at least 3 decimal places SC2 if only 1761.32 seen	

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3	(a)	Kite	1		
	(b)	(i)	Rotation 90° clockwise (or 270° anti-clockwise) oe [centre] origin oe	1 1 1	
		(ii)	Translation $\begin{pmatrix} -2 \\ -10 \end{pmatrix}$	1 1	Accept 2 left and 10 down oe
		(iii)	Enlargement [Scale Factor] –3 [centre] (–3,4)	1 1 1	
	(c)	(i)	[x2=] $3^2 + 1^2$ [x=] $\sqrt{3^2 + 1^2}$ or [x=] $\sqrt{9+1}$ or $\sqrt{10}$ and = 3.162...	M1 M1dep	M1 for $3^2 + 1^2$ or better Needs a value to 3 or more decimal place
		(ii)	9.15	3	B1 for $\sqrt{2}$ or 1.41 or better seen M1 for $2 \times 3.16 + 2 \times their$ 1.41... soi by 9.14 If zero scored SC1 if answer in range 8.6 to 9.6
(iii)		27.45 to 27.5	1FT	their (c) (ii) $\times 3$	
4	(a)	2.82 or 2.816 to 2.817	2	M1 for $\frac{h}{6} = \sin 28$ or better	
	(b)	2.23 or 2.232 to 2.233 m ²	3 1	M2 for $2 \times 2 - \pi \times 0.75 \times 0.75$ OR M1 for 2×2 or $\pi \times 0.75 \times 0.75$ seen.	
	(c)	(i)	1	e.g. same scale factor (must have same oe)	
		(ii)	1	allow decimals	

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5	(a)	(i) 1, 7, 1	1, 1, 1	P2FT for 6 or 7 correct P1FT for 4 or 5 correct	
		(ii) 8 points correctly plotted	P3FT		
			Correct smooth curve through all 8 correct points	C1	
	(b)		-1.1 to -1.3 and 4.1 to 4.3	1FT, 1FT	
	(c)	(i)	Line $x = 1.5$ drawn	1	Equation of <i>their</i> line in (c)(i)
		(ii)	$x = 1.5$ oe	1FT	
(d)	(i)	Ruled continuous line drawn	1	M1 for $\frac{\text{rise}}{\text{run}}$ for <i>their</i> line <i>their</i> (d) (ii) + <i>their</i> 2	
	(iii)	1	2		
	(iii)	$[y =] x + 2$	1FT		
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° , 48° , 24°	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	
	(d)		3 'correct' labels	1	Independent
			$\frac{2}{5}$	2	

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7	(a)	[Angle DCE =] 36.9 or 36.8699 to 36.9	3	B1 for [DE =] 0.75 soi M1 for $\tan DCE = \frac{\text{their } DE}{1.0}$
	(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) $\times 2$
	(d)	(i) 0.96 (ii) 10	1 2	M1 for 0.04×250 or 0.96×250
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	2 1FT	B1 for $6n + a$ or $bn + 2$ $b \neq 0$ ft linear expression in (c) (i)
	(d)	$7n + 1$ oe final answer	2	B1 for $7n + c$ or $dn + 1$ $d \neq 0$
	(e)	$n - 1$ final answer	2FT	B1FT for $n + j$ or $kn - 1$ $k \neq 0$
9	(a)	(i) $[r =] \sqrt{\frac{3V}{\pi h}}$ (ii) $[r =] \sqrt{\frac{3 \times 141}{\pi \times 15}}$	2 M1FT	B1 for $[r^2 =] \frac{3V}{\pi}$ or $\frac{3V}{h}$ seen or better. <i>their</i> formula
	(b)	$[r =] 2.99\dots$	A1	
	(c)	18.9 or 18.8 or 18.849 to 18.852 1.9 [cents] cao	2 3	M1 for $2 \times \pi \times 3$ oe M1 for 2.15 (or 215) $\div 113$ A1 for $0.019(0\dots)$ or $1.9(0\dots)$ soi