

MARK SCHEME for the May/June 2014 series

0580 MATHEMATICS

0580/33

Paper 3 (Paper 3), 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
dep	dependent
FT	follow through after error
isw	ignore subsequent working
oe	or equivalent
SC	Special Case
nfww	not from wrong working
soi	seen or implied

Qu.		Answers	Mark	Part Marks
1	(a) (i)	reflection	1	
		$y = -x$ oe	1	
	(ii)	rotation	1	
		[centre] (3, 2)	1	
		90° anticlockwise oe	1	
	(iii)	Enlargement	1	
[Scale factor] 2		1		
	[Centre] (3,-3)	1		
(b) (i)	shaded square correct	1	B1 for 7 or 8 corners correctly marked	
	(ii) Correct reflection	2		
2	(a) (i)	23.55, 23.65	2	B1 for 1 correct or both in reverse order
		(ii) 9.2[0]	2	M1 for 8×1.15 oe
		(iii) 12.5	1	
	(iv)	28.8	2	M1 for $8 \times \frac{60 \times 60}{1000}$ or better
	(b) (i)	4 points correct	2	B1 for 3 correct
		(ii) Negative	1	
	(iii)	the longer the distance, the quicker the time oe	1	Or the shorter the distance the longer the time oe
	(iv)	continuous ruled line of best fit	1	Dependent on at least 9 points on graph
	(v)	17.0 to 17.5	1FT	FT dependent on negative line
	(vi)	Outside the range [of the data] oe	1	

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3	(a)	22.5[0]	3	M1 for $(2 \times 8.5 + 6 + 4.50)$ M1 for 50 – their total	
	(b)	[0]945	1		
	(c)	104	1		
	(d)	(i)	27	2	M1 for $\frac{45}{5} \times 3$
		(ii)	2 : 3 cao	2	M1 for $(\text{their } 27 + 3) : 45$ or better If zero SC1 for 3 : 2
	(e)	5	3	M1 for $\frac{85-25}{7.50}$ soi by 8 M1 for $\frac{\text{their } 8}{2} + 1$	
	(f)	3.75, 3.57... 3.61... [g/c] small [bag]	3	M1 for 1 correct division, not evaluated M1 for 2 further consistent correct divisions, not evaluated	
	(g)	(i)	105	1	
(ii)		correct locus drawn	2	M1 for any arc centre exit	
(iii)		S marked correctly	3	B1 for indication of bearing of 212° B1 for indication of bearing of 293°	
4	(a)	Frequencies 3, 5, 6, 1	2	B1 for 4 frequencies adding to 15 and at least two correct values or B1 for three correct values SC1 for fully correct tallies and nothing in frequency column.	
	(b)	(i)	3	1	
		(ii)	12	1	
		(iii)	11	1	
		(iv)	11.3 (...)	2	M1 for $(10 \times \text{their } 3 + 11 \times \text{their } 5 + 12 \times \text{their } 6$ $+ 13 \times \text{their } 1) \div 15$
	(c)	(i)	$\frac{3}{15}$ or $\frac{1}{5}$ or 0.2	1FT	isw
(ii)		0	1		

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5	(a) (i)	one of e.g. cone, sphere, pyramid	1	
	(ii)	Ah	1	
	(b) (i)	339	2	M1 $\pi \times 3^2 \times 12$
	(ii)	1.2 cao	4	M2 FT for $\frac{\text{their } 339 - 160}{150}$ soi or M1 FT for <i>their</i> $339 - 160$ soi A1 for 1.19... If A0 scored then B1 for correct rounding of their 3 sig fig or more answer.
(iii)	$r = \sqrt{\frac{v}{\pi h}}$	2	M1 for $r^2 = \frac{v}{\pi h}$	
6	(a) (i)	$y = 5$ drawn	1	
	(ii)	$x = -3$ drawn	1	
	(b) (i)	$(-3, 5)$ cao	1	
	(ii)	$y = k$ oe	1	$k \neq 5$
	(c) (i)	10, -2 -2, 10	2	B1 for 3 correct
	(ii)	8 correct points plotted	3FT	B2 FT for 6 or 7 correctly plotted points or B1 FT for 4 or 5 correctly plotted points
	(iii)	correct curve drawn	1	For smooth correct curve, going below $y = -2$
	(1.5 cao, k)	1	where $-2.5 < k < -2$	

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7	(a) (i)	$2x$ $x - 8$	1, 1	
	(ii)	$x + 2x + x - 8 = 40$ or better	1FT	FT if algebraic
	(iii)	12 cao	2	M1 FT for $ax = b$ and a and b not zero
	(b)	195 cao	4	B1 for 75 B1 for 150 B1 for 180
	(c)	178.65 or 178.7 or 179	3	M2 for 150×1.06^3 oe or M1 for $150 \times 1.06 \times 1.06$
	(d) (i)	Add 4 oe	1	
	(ii)	$4n - 3$ oe, final answer	2	M1 for $4n + k$ (k not -3), $qn - 3$ (q not 0 or 4) seen
8	(a)	6	2	M1 for $\frac{30 \times 2}{10}$ oe or better
	(b) (i)	Trapezium	1	
	(ii)	77	2	M1 for $\frac{(14+8)}{2} \times 7$ oe
(c)	[40], 40, 100	1, 1		
9	(a)	Angle [in the] semi-circle [equals 90°]	1	
	(b)	12	3	M2 for $[BC = \sqrt{(13^2 - 5^2)}$ or better or M1 for $5^2 + BC^2 = 13^2$ or better
	(c)	22.6	2	M1FT for $\tan^{-1} \frac{5}{\text{their } 12}$ or M1 for $\sin^{-1} \frac{5}{13}$ or M1FT for $\cos^{-1} \frac{\text{their } 12}{13}$