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General Certificate of Secondary Education
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Mathematics 43055/2H
Higher
Module 5 Paper 2

Final

Mark Scheme

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The following abbreviations are used on the mark scheme:

M	Method marks awarded for a correct method.
M dep	A method mark which is dependent on a previous method mark being awarded.
A	Accuracy marks awarded when following on from a correct method. It is not necessary always to see the method. This can be implied.
B	Marks awarded independent of method.
ft	Follow through marks. Marks awarded for correct working following a mistake in an earlier step.
SC	Special Case. Marks awarded for a common misinterpretation which has some mathematical worth.
oe	Or equivalent.

MODULE 5 HIGHER TIER **43055/2H**

1a	8	B1	
1b	$4y - 20$ (= 28)	M1	$(y - 5 =) \frac{28}{4}$ (= 7)
	$4y = 48$	A1	$y - 5 = 7$
	12	A1 ft	ft from an equation SC1 8.25 oe
1c	$\frac{4}{2}$ (and) $\frac{11}{2}$	M1	2 (and) $5\frac{1}{2}$ oe $2 \leq w \leq 5$ or $2 \leq w < 6$
	2, 3, 4 (and) 5	A2	M1 A1 for 3, 4 (and) 5 only M1 A1 for 2, 3 (and) 4 only

2a	4	B1	
2b	60	B1	
2c	16	B1	
2d	Cold because the line is steeper or other valid explanation	B1	Using gradients is a valid explanation eg 1 Cold with 15 (l/min) and 5 (l/min) seen eg 2 Cold with 3 and 1 seen B0 Cold with no valid explanation
2e	100 ÷ 20	M1	Line of gradient - 20 drawn from (20, 100) on the graph or 25 seen
	5	A1	SC1 4.5 or 4 min 30 s

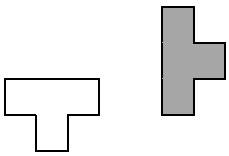
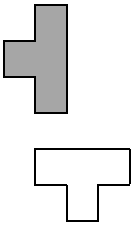
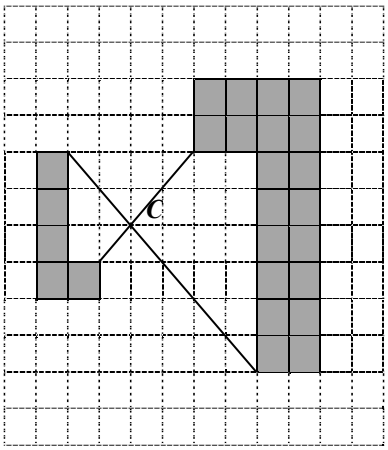
3	$2x + x = 180$ or $3x = 180$ or 180 ÷ 3	M1	52 × 3	52 × 2 (= 104)
	$(x =)$ 60	A1	156	(180 – 104 =) 76
	Should be 52	A1 ft	Should be 180	Should be 52

4a	(Conversion factor) 2.2	B1	or 2.21 or 2.205…
	8 ÷ their 2.2 or 8 ÷ 2 or 8 × 0.5	M1	3.8 × their 2.2 or 3.8 × 2 or 3.8 ÷ 0.5
	3.6(…) (and) Robert	A1 ft	8.36 or 8.4 (and) Robert SC1 A weight calculated for one person with units shown (working must be seen) and correct person selected (ft)
4b	4 000 000	B1	

5	All 3 lines drawn correctly	B2	B1 for any one line drawn correctly
	$\frac{1}{2}$ × their base × their height $\left(\frac{1}{2}\times 5\times 5 \text{ if correct}\right)$	M1	their 3 lines must make a triangle
	12.5	A1 ft	oe ft from any triangle

6a	–	B1	
6b	÷ ×	B1	Only this order
6c	÷	B1	
6d	+ –	B1	Either order

7	6 –2 –10 in any order	B2	B1 for any 2 correct in any order

8a		B2	B1 (Quarter turn clockwise rotation about *P*) 
8b	Correct size, orientation and position 	B2	B1 for correct size and orientation but incorrect position B1 for at least 2 vertices correct with an L-shape attempted

9	16×4 (= 64)	M1	
	π ($\times$) 8^2 (÷2) or 64π (÷2) (= [200.9, 201.1])	M1	Condone π ($\times$) 16^2 (÷2) (= [401.9, 402.2]) but can only subsequently score B1 ft
	$\frac{\pi(\times)8^2}{2}$ + their 64 or $\frac{64\pi}{2}$ + their 64	M1	$\frac{\pi(\times)8^2}{2}$ + 16×4 is M3
	[164.45, 164.55]	A1	
	160 or 164 or 165	B1 ft	ft to 2 or 3 sf from value seen > 2 or 3 sf eg do not accept 164 if 164.55 seen for A1

10a	$3x(4x - 1)$ or $-3x(1 - 4x)$	B2	B1 for $x(12x - 3)$ or $3(4x^2 - x)$ or $-x(3 - 12x)$ or $-3(x - 4x^2)$
10b	$(x + 10)(x - 3)$	B2	B1 for $(x \pm a)(x \pm b)$ where $ab = 30$

11	Any two of these equations correct $2x + 3y = 26$ $x + 2y = 15$ $x + y = 26 - 15$ (= 11)	M2	oe M1 for any one correct equation
	Uses their two equations and attempts to make coefficients of one letter equal and attempts to subtract	M1	
	$x = 7$ and $y = 4$	A1	
	23	A1	
	Alternative method 1		
	26 – 15 (= 11)	M1	
	15 – their 11 (= 4)	M1	
	15 – 2 $\times$ their 4 (= 7) or $\frac{26 - 3 \times \text{their } 4}{2}$ (= 7)	M1	
	7 and 4	A1	
	23	A1	
	Alternative method 2		
	$2 \times 15 - 26$ (= 4)	M3	30 – 26
	7 and 4	A1	
	23	A1	

12ai	Angle at centre is twice angle at circumference	B1	oe Allow middle for centre Allow edge or outside for circumference
12aii	Opposite angles in a cyclic quadrilateral add up to 180°	B1	oe
12b	(*SOQ* =) 100° and (*SRQ* =) 130° and opposite angles are not equal	B2	oe B1 (*SOQ* =) 100° and (*SRQ* =) 130° with no valid explanation B1 One correct angle (*SOQ* =) 100° or (*SRQ* =) 130° and opposite angles are not equal

13a	(y =) $2 - 3x$	M1	
	–3	A1	SC1 Answer 3 or $-3x$
13b	0, 2	B1	

14a	*B* or (y =) $2 \sin x$	B1	
	A or (y =) $\cos x$	B1	
	D or (y =) $\sin x$	B1	
14bi	Line from (0, 5) to (6, 9)	B1	
14bii	Line from (–5, 2) to (–1, –2)	B1	
14biii	Line from (–1, –3) to (3, 1)	B1	

15	$\frac{\sin C}{14} = \frac{\sin 52}{15}$	M1	oe
	(sin *C* =) $\frac{\sin 52}{15} \times 14$	M1	0.735(…) or 0.74
	(*C* =) 47(.3…)	A1	
	[80.65, 81]	A1 ft	ft 180 – 52 – their *C* Must have gained M2

16	$\frac{1}{3} \times 15 \times 15 \times (8 + 12)$	M1	
	1500	A1	
	$15 \times \frac{8}{20}$ (= 6)	M1	oe
	their 1500 $-\frac{1}{3} \times$ their 6 $\times$ their 6 $\times$ 8	M1 dep	dep on M2
	1404	A1	Accept 1400 with correct working
	Alternative method		
	$\frac{1}{3} \times 15 \times 15 \times (8 + 12)$	M1	
	1500	A1	
	$8^3 : 20^3$ (= 512 : 8000)	M1	oe eg 8 : 125
	their $\frac{8000 - 512}{8000} \times$ their 1500	M1 dep	= 0.936 $\times$ 1500 oe dep on M2
	1404	A1	Accept 1400 with correct working