Version : 1.0: 11.10

General Certificate of Secondary Education
November 2010

Mathematics 43055/1H
Higher
Module 5 Paper 1

Final

Mark Scheme

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Set and published by the Assessment and Qualifications Alliance.

The Assessment and Qualifications Alliance (AQA) is a company limited by guarantee registered in England and Wales (company number 3644723) and a registered charity (registered charity number 1073334).
Registered address: AQA, Devas Street, Manchester M15 6EX

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 **43055/1H**

1a	x – 5 = 13 and valid mathematical reason	B1	eg different answer Accept valid alternatives
1b	Volume and valid mathematical reason	B1	eg all others are lengths Accept valid alternatives
1c	Sector and valid mathematical reason or arc indicated and valid mathematical reason	B1	eg area, others lengths eg arc has no straight line parts Accept valid alternatives

2ai	*B*	B1	
2aii	*D*	B1	
2aiii	*E*	B1	
2b	(5 + 5 + 3) × 2	M1	oe Allow 1 error eg (5 + 4 + 3) × 2
	26	A1	SC1 for 21 - 27
	cm^2	B1	

3a	c	B1	
3b	d	B1	
3c	g	B1	

4	147	B1	
	0	B1	
	x + 5	B1	Accept x^2 – 10x + 33
	–1	B1	

5a	14	B1	
5b	12	B1	
5ci	Straight line drawn from (1036, 50) to (1110, 50) **and** line drawn from (1110, 50) to (1150, 0)	B1	Need not be ruled between (1036, 50) to (1110, 50) $\pm\frac{1}{2}$ square tolerance Allow curve between 1110 and 1150
5cii	50 ÷ 2 × 3 or 50 ÷ 40 (×60) or 25 × 3	M1	oe 1.25, $\frac{5}{4}$ Accept [0.66, 0.67] for $\frac{2}{3}$
	75	A1	SC1 for [73, 77]
5di	30 000 × 1.10 or 30 000 ÷ 15 or $\frac{1.10}{15}$	M1	oe
	30 000 × 1.10 ÷ 15	M1 dep	oe
	2200	A1	SC1 for the digits 22(000…)
5dii	Valid reason	B1	eg petrol price goes up Changes car Petrol consumption higher (worse)(more) Drives slower/faster

6	π × 40	M1	oe eg 3.14 × 40
	π × 40 ÷ 2 or π × 40 ÷ 4	M1 dep	oe
	π × 40 ÷ 2 ÷ 4	M1 dep	oe
	15.7	A1	Note: 31.4 or 62.8 or 10π or 20π gets M1 M1 M0 A0 Note: 5π gets M3 A0

7a	$4x - 20$	B1	
7b	$9x - 4x$ or $-3 - 7$ or $4x - 9x$ or $3 + 7$	M1	oe
	$5x = -10$	A1	oe
	-2	A1	
7c	$8x < 5$	M1	
	$x < \frac{5}{8}$	A1	oe $(x =) \frac{5}{8}$ SC1
7d	$15x^7y^9$	B2	B1 for two correct terms
7e	$3(x - 4)$ or $3x - 12$	B1	
	$x - 3x = -12 - 20$ or $-2x = -32$ or x – their $3x$ = their $-12 - 20$	M1	oe
	16	A1	

8	3	B1	

9	$2y = x + 6$ $2y = 4x - 6$	$4y = 2x + 12$ $y = 2x - 3$	M1	$y = \frac{x+6}{2}$ $y = 2x - 3$	oe Matching coefficients of x and y
	$x + 6 = 2(2x - 3)$ or $4y - 12 = y + 3$			For correct elimination of x or y	
	$3x = 12$ or $3y = 15$		M1 dep	oe For correct simplification	
	$x = 4$ and $y = 5$		A1	SC1 for correct answers with no working or trial and improvement	

10	$\frac{PR}{5} = 0.8$ or $\frac{QR}{PR} = 0.9$ or $\tan x = \frac{PR}{5}$ or $\cos y = \frac{QR}{PR}$	M1	oe
	0.8×5 or 4	M1 dep	
	$0.8 \times 5 \times 0.9$ or 4×0.9	M1 dep	
	3.6	A1	

11a	$y + t = \frac{x}{w}$ or $yw = x - tw$	M1	
	$w(y + t)$ or $wy + wt$	A1	
11bi	$2x^2 - 2xy + 3xy - 3y^2$	M1	Allow one incorrect term
	$2x^2 - 2xy + 3xy - 3y^2$	A1	Fully correct
	$2x^2 + xy - 3y^2$	A1 ft	ft from four terms where collection is possible
11bii	$2x^4 + x^2y^3 - 3y^6$	B2 ft	B1 for complete correct change of one variable ft from 3 or 4 terms in bi B1 for $2x^4 - 2x^2y^3 + 3x^2y^3 - 3y^6$ with one incorrect term

12	3 or $\frac{1}{3}$ seen or 1 : 3 or 3 : 1	M1	oe 7.5 ÷ 2.5 or 2.5 ÷ 7.5 or 18
	their 3^2 or their $\left(\frac{1}{3}\right)^2$ or 9 or $\frac{1}{9}$ seen or 1 : 9 or 9 : 1	M1 dep	oe $\left(\frac{7.5}{2.5}\right)^2$ or $\left(\frac{2.5}{7.5}\right)^2$ or 54 ÷ 7.5 ÷ 3 × 2.5
	6	A1	

13a	cos $C = \frac{10}{20}$ or sin A = $\frac{10}{20}$	M1	$20^2 - 10^2$
	$C = 60$ or A = 30	A1	$\sqrt{300}$
	$\frac{1}{2} \times 20 \times 10 \times 0.866$ or $\frac{1}{2} \times 20 \times 10 \times$ sin (their C)	M1	$\frac{1}{2} \times$ their $\sqrt{300} \times 10$ sin (their C) must be a value
	86.6 or 87	A1 ft	$5\sqrt{300}$ or $50\sqrt{3}$
13b	$\frac{1}{2} \times 20 \times h$ = their 86.6 or their 87	M1	Where $h = \frac{1}{2}PR$
	$\frac{2 \times \text{their } 86.6}{20}$	M1 dep	$5\sqrt{3}$ or 8.66
	(PR =) 2 × their 8.66	M1 dep	
	17.32 or 17.3 or 17.4	A1 ft	[17.3, 17.4] $\sqrt{300}$ or $10\sqrt{3}$
	Alternative method 1		
	(Area of kite =) 2 × their 86.6	M1	
	$\frac{1}{2} \times 20 \times PR = 2 \times$ their 86.6	M1 dep	
	(PR =) $\frac{2 \times 2 \times \text{their } 86.6}{20}$	M1 dep	
	17.32 or 17.3 or 17.4	A1 ft	
	Alternative method 2 (Trig)		
	0.866 = $\frac{h}{10}$ or sin 60 = $\frac{h}{10}$	M1	Where $h = \frac{1}{2}PR$
	(h =) 10 × 0.866	M1 dep	
	(PR =) 2 × 10 × 0.866	M1 dep	
	17.32 or 17.3 or 17.4	A1 ft	

14	$CP = CR$	B1	Sides of square
	$AC = AC$	B1	Common side
	Angle ACP = Angle ACR or $AR = AP$	B1	Angle ACP = 45 + 90 = 135 Angle ACR = 45 + 90 = 135 Mention of Pythagoras
	(Congruent) SAS or (congruent) SSS (from $AR = AP$)	B1	Missing reasons - lose at most 1 mark - max 3 out of 4 Must follow from three statements