Version : 1.0: 0710

General Certificate of Secondary Education

Mathematics 4307

Specification B

Module 5 Paper 1 Tier H 43055/1H

Final

Mark Scheme

2010 examination - June series

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.

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The following abbreviations are used on the mark scheme:

M	Method marks awarded for a correct method.
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.
E	Marks awarded for an explanation.
M dep	A method mark which is dependent on a previous method mark being awarded.
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

1(a)	(+)2	B1	
1(b)(i)	$\left(\frac{x}{3} =\right) 9 - 5$ or 4	M1	$x + 15 = 27$
	12	A1	
1(b)(ii)	$3y - 15$	M1	$y - 5 = \frac{18}{3}$
	$3y = 18 + 15$	M1 dep	$y = 6 + 5$ $y = \frac{18}{3} + 5$
	$(y =)$ 11	A1	
1(c)	0	B1	

2(a)	$10^{(1)}$ 10^3 10^5 10^7	B2	B1 for 2 or 3 correct 10^0 10^2 10^4 10^6 SC1 $10^{(1)}$ 10^2 10^4 10^6 SC1
2(b)	1 000 000 000 or 10^9	B1 ft	oe Accept 1 billion 1 thousand million ft only if last three terms are 10^2 10^4 10^6

3(a)	Correct shape in correct position	B3	B2 for correct shape, wrong position (must be on grid) B1 for one rectangle correct size, any position (8×2, 4×2, 6×2, 2×2)
3(b)	90º rotation	M1	Allow correct rotation with 1 extra square or 1 missing square on long side only
	90º rotation clockwise full shape	A1	
	Correct centre of rotation for their diagram	B1 ft	ft any rotation Correct with top square missing implies M1 A0 B1

4(a)	10×5 or 10×10 or 5×5	M1	oe 10×20 or $(2 \times) 50$ or 20×20 or $(4 \times) 5 \times 5$
	$50 \times 4 + 100$ or $6 \times 5 \times 10$	M1 dep	$10 \times 20 + 2 \times 50$ or $20 \times 20 - 4 \times 5 \times 5$
	300	A1	If misread of 5, 2.5, SC2 for 75 SC1 for equivalent of the first M1
	cm^2	B1	Units mark
4(b)	$4 \times 10 + 8 \times 5$	M1	oe 4×20
	80	A1	If misread in (a) 40 $\Rightarrow$ M1 A1
4(c)	Valid explanation	B1	eg not all sides on outside of shape Perimeter = $40 \times 4 + 20$ (= 180) and 4×80 is not equal to 180

5(a)	(–1, 2)	B1	
5(b)	$y = x + 3$ drawn	B2	B1 for $y = mx + 3$ B1 for $y = x + c$ B1 for two or more correct points without contradictions

6	6×5 or 6×20 or 5×20	M1	oe 30, 120, 100 Allow $\frac{1}{2} \times 6 \times 5 \times 20$ or 300
	$6 \times 5 \times 20$	M1 dep	
	600	A1	

7	$180 - 168$ or 12	M1	oe $(2n - 4)90 = 168n$ M1 $180n - 360 = 168n$ $12n = 360$
	360 ÷ their 12	M1 dep	
	30	A1	

8(a)	$21 + 9x$ or $20x - 12$	B1	
	$3(7 + 3x) = 4(5x - 3)$ or their $21 + 9x$ = their $20x - 12$	M1	
	$33 = 11x$	A1	oe $-11x = -33$, $11x = 33$, $-33 = -11x$
	3	A1	
8(b)	3	B1 ft	

9(a)	Semi-circle (centre *P*)	B1	Accept sketch
	Radius 8 metres	B1	Diameter = 16 m Condone cm
9(b)	Two arcs cutting off bottom corners	B2	Accept sketch Ignore out field cutting vertical sides B1 Arc centre P cuts vertical edges B1 for one corner only B1 for straight corners

10(a)	$\frac{1}{\sqrt{5}} = 0.447$	B1	
10(b)	$0.5 \times 4 \times 5 \times \sin 26.6$ or $\frac{1}{2} \times 4 \times 5 \times \frac{1}{\sqrt{5}}$	M1	$10 \times$ their (a)
	4.47	A1 ft	ft their (a) Accept $\frac{10}{\sqrt{5}}$ or $2\sqrt{5}$ Ignore fw
10(c)	$\frac{1}{2} \times 1850$ or tan 26.6 seen	M1	eg 0.5 seen
	925	A1	
	their 925 + 330.4 + 1.8	M1	1850 tan 26.6 + 330.4 + 1.8 M1 M1
	1257(.2)	A1 ft	ft their genuine attempt to find 925
	1260	B1 ft	**Note**: 332.2 → 330 implies B1 ft

11	One of the six equations $6z = 30$ $2x + y = 5$ $2x + 3y = 19$	M1	oe $x + y + z = 11$ $x + 2y + 2z = 23$ $2x + y + 3z = 20$
	Two of the six equations	M1	oe
	Three of the six equations	M1	oe
	$z = 5$ or $x = –1$ or $y = 7$	A1	
	Two of $z = 5$ or $x = –1$ or $y = 7$	A1	
	$z = 5$ and $x = –1$ and $y = 7$	A1	
	Alternative to follow only when $z = 6$		
	$6z = 30$	M1	
	$z = 6$	A0	
	One of the other five equations ie $2x + y = 5$ $2x + 3y = 19$ $x + y + z = 11$ or $x + y + 6 = 11$ $x + 2y + 2z = 23$ or $x + 2y + 12 = 23$ $2x + y + 3z = 20$ or $2x + y + 18 = 20$	M1	
	Two of the five equations	M1	
	$x + y + 6 = 11$, $x + 2y + 12 = 23$ used $x = –1$ or $y = 6$ $x + y + 6 = 11$, $2x + y + 18 = 20$ used $x = –3$ or $y = 8$ $x + 2y + 6 = 12 = 23$, $2x + y + 10 = 20$ used $x = -\frac{7}{3}$ or $y = \frac{20}{3}$	A1	
	$x = –1$ and $y = 6$ or $x = –3$ and $y = 8$ or $x = -\frac{7}{3}$ and $y = \frac{20}{3}$	A1	

12	$5x^2 - 35xy + 4xy - 28y^2$	M1	Allow one error
	$5x^2 - 35xy + 4xy - 28y^2$	A1	
	$5x^2 - 31xy - 28y^2$	A1 ft	ft four terms

13(a)	Correct sketch	B1	Condone full graph Condone touching axes
13(b)	Correct explanation	B1	eg it halves Do not accept: It goes smaller

14	$\pi 4^2.2$ or $\frac{1}{3}\ \pi 2^2.12$ or $\frac{4}{3}\ \pi.3^3$	M1	Ignore y throughout first 4 marks Ignore any value for y throughout first 4 marks
	$32(\pi)$ or $16(\pi)$ or $36(\pi)$	A1	(100.4 to 100.6, 50.2 to 50.3, 113 …)
	Two of $32(\pi)$ or $16(\pi)$ or $36(\pi)$	A1	May be multiples if values used
	$32(\pi)$ and $16(\pi)$ and $36(\pi)$	A1	May be multiples if values used
	Any one of $32\ \pi y^3$, $16\ \pi y^3$, $36\ \pi y^3$	A1	
	Cone $16\ \pi y^3$ Cylinder $32\ \pi y^3$ Sphere $36\ \pi y^3$	A1	

15	$5(x^2 - 121)$ or $(x - 11)(5x + 55)$	B1	$(x - 11)(x + 11)$
	$5(x - 11)(x + 11)$ or $(5x - 55)(x + 11)$	B1 dep	
	$2x(x + 11)$	B1	
	$\frac{5(x-11)}{2x}$ or $\frac{5x-55}{2x}$	B1	Do not ignore further working