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ASSESSMENT and QUALIFICATIONS ALLIANCE

General Certificate of Secondary Education

Mathematics 3302
Specification B

Module 5 Paper 1 Tier I 33005I1

Mark Scheme

2005 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.

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.
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.
eeoo	Each error or omission.

MODULE 5 Paper 1 INTERMEDIATE TIER 33005/I1

1(a)	i) 81	B1	
	243	B1 ft	ft their $3^4 \times 3$
	ii) $\frac{1}{81}$	B1 ft	ft on reciprocal of (i)
	$\frac{1}{243}$	B1 ft	ft on reciprocal of (i) and their $\frac{1}{81}$
(b)	$3 \times 9 - 18$	M1	
	9	A1	

2(a)	5×3 (+) 2×-4 or 15 (+) –8	M1	23 implies M1A0
	7	A1	
(b)	$16 = 10 + 2c$	M1	$(c =) \frac{a-5b}{2}$
	$6 = 2c$	M1	$(c =) \frac{16-10}{2}$ $10 + 2 \times 3$ (= 16) scores M2
	3	A1	

3	30 or 24	M1	324 implies M1A0
	54	A1	$5.4 \times 10 = 54$ scores M1A1

4	$360 - (100 + 40 + 80)$ or $x + 100 + 40 + 80 = 360$	M1	oe Condone missing brackets
	140	A1	

5	$\frac{10}{12}$ and $\frac{9}{12}$ 0.83... and 0.75 or 10 **and** 9 squares shaded	M1	Must be able to compare eg Common denominator (at least one numerator correct) eg Conversion to decimals (at least one decimal correct)
	$\frac{5}{6}$ or $\frac{10}{12}$ or 0.83...	A1	

6(a)	Even	B1	
(b)	Odd	B1	

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7	Valid attempt at construction	M1	eg At least two diameters drawn eg At least two arcs drawn eg Any hexagon drawn eg At least two marks in region of correct positions
	Regular hexagon completed	A1	Must be ruled

8(a)	i) 120	B1	
	ii) 240	B1	
(b)	Line drawn on bearing of 070° from *E*	B1	± 2° tolerance
	Line drawn on bearing of 320° from *F*	B1	± 2° tolerance For both marks lines must intersect If two dots within correct regions shown but no lines allow B1B0

9(a)	Angle $B = 70$ or $180 - 20 - 70$ or Angle $DCA = 20$ or Angle $DAC = 90$	M1	May be seen on diagram
	Angle $ACB = 90$	A1	Method must be seen
(b)	8.4×2	M1	
	16.8	A1	

10(a)	$2(5p - 2)$	B1	
(b)	$q(q + 3)$	B1	
(c)	$r(r - 1)$	B1	
(d)	t^5	B1	

11(a)	–4 –3 4	B2	–1 eeoo
(b)	Five points plotted	B1 ft	$\pm \frac{1}{2}$ square
	Smooth curve	B1 ft	Through all five points $\pm \frac{1}{2}$ square

12	1 correct trial > 1	M1	$2 \rightarrow 8$ $3 \rightarrow 21$ $4 \rightarrow 40$ $5 \rightarrow 65$ $6 \rightarrow 96$ $7 \rightarrow 133$ $8 \rightarrow 176$
	2nd correct trial	M1 dep	Must be improvement on 1st trial
	$(x =)$ 6	A1	

13(a)	$3x \leq 11$	M1	$(x =) \frac{11}{3}$ $11 \div 3$ $x \leq \frac{16-5}{3}$ $x < \frac{16-5}{3}$
	$x \leq \frac{11}{3}$ or 3.66... or 3.67	A1	oe
(b)	$\frac{5}{2} < x < \frac{7}{2}$ or $2x = 6$	M1	oe $5 < 2 \times 3 < 7$
	3	A1	

14(a)	9.4 cm	B1	
(b)	Valid reason	B1	Accept: Angles opposite to side 5.6 cm In the same position Smallest angles (in the triangle) Angles between 9.4 and 10.3 Corresponding (angles) Not accept: Rotation Reflection (unless clarified)

15(a)	$(x + a)(x + b)$	M1	$ab = \pm 14$
	$(x + 7)(x – 2)$	A1	
(b)	–7, 2	B1 ft	ft from two linear brackets

16(a)	$y = 5x + c$ $c \neq 0$	B1	oe
(b)	$y = – 2x + 6$	M1	$–2x$ scores M1A0 $m = –2$ and $c = 6$ scores M1A0
	$(m =) –2$	A1	

17(a)	π (×) 5^2	M1	Condone 3.1… × 5^2	
	π (×) 5^2 × 10 or their area × 10	M1	Condone 3.1… × 5^2 × 10 Their area must contain π (or 3.1...)	
	250π or 250 × π or π × 250	A1	775 to 790 implies M2A0 Do not accept π250 Ignore fw 250π can be recovered in (b)	
(b)	40 × 50	M1	10 × 10 × 10	40 × 50
	their 2000 × 10	M1	their 1000 – their 250π	20 × their π (×) 5^2
	20 × their 250π	M1	20 × their (1000 – 250π)	their 2000 – their 500π
	20 000 – 5000π	A1	oe 4290 – 4500 implies M3A0 Ignore fw except 15000π	

18(a)	45	B1	
(b)	53	B1	
(c)	90	B1	
(d)	80	B1	

19(a)	$\frac{1}{2} \times 4 \times 4$ or $\frac{1}{2} \times 8 \times 4$ or 4×4 or $x^2 + x^2 = 64$ or $4^2 + 4^2 = y^2$	M1	Correct attempt at **one** area
	$\frac{1}{2} \times 4 \times 4 \times 4$ or $\frac{1}{2} \times 8 \times 4 \times 2$ or $4 \times 4 \times 2$ or 8×4 or $8 \times 8 = 64$ and $64 \div 2$ or $2x^2 = 64$ or $x = \sqrt{32}$ or $\sqrt{\text{their } y^2}$	M1 dep	Correct attempt at **total** area
	32	A1	Notes: Penalise if clearly using perimeter $8 \times 8 = 64$ and $64 \div 4 = 16$ scores M0
(b)	i) 2×25 or $100 - 50$	M1	oe
	50	A1	
	ii) Attempt to use patterns of areas or lengths or stating or implying that 29.7 cm is redundant data	M1	Area 50, 100, 200, 400, (800) Pattern 1 (5 cm) Pattern 3 (10 cm) Pattern 5 (20 cm)
	Pattern 5	A1	