



General Certificate of Secondary Education

Mathematics 3301 *Specification A*

Paper 1 Intermediate Tier

Mark Scheme

2006 examination – November 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.

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.
- M dep** awarded. 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.

Paper 1I

1	3	B1	
	(Their 3) – 10	B1ft	–7
2	Straight line passing through (0, 0) and (300, 36) $\pm \frac{1}{2}$ small square	B3	B2 for two correct points plotted or any line through two correct points $\pm \frac{1}{2}$ small square B1 300, 36 seen SC2 Straight line joining (0, 0) to (300, 3.6)
3(a)	1, 2, 3, 4, 6, 9, 12, 18, 36 seen	M1	oe eg, 1×36 , 2×18 , 4×9 , 3×12 , 6×6 seen Allow up to 2 errors or omissions
	12 and 18	A1	
3(b)	1 + 2 and 1×2 or 1 + 8 and 1×8 or 3 + 6 and 3×6	M1	or ft Their 2-digit factors
	18	A1	SC1 any value that satisfies both conditions eg, 88
4(a)	10 km = 10000 m	B1	Allow if $10000 \div 400$ seen
	(Their 10000) \div 400	M1	oe
	25	A1	
4(b)	$400 \div 80$	M1	
	5	A1	
4(c)	(Their 10000) \div (Their 5)	M1	or (Their 25) \times 80
	(Their 2000) \div 60	M1dep	oe
	33 minutes 20 seconds	A1	

<p>5(a)</p>	<p>Fully correct bar chart</p> <p>Frequencies Walk (10), Bus (8), Car (6) and Bike (6)</p> <p>Format Horizontal or vertical Labelled frequency axis Scale on frequency axis Equal width bars correctly labelled Condone no gaps between bars Condone lines</p>	<p>B4</p>	<p><i>Bar chart attempted</i></p> <p>B3 All frequencies correct, 1 or 2 format errors</p> <p>B2 Three frequencies correct, 1 or 2 format errors or Two frequencies correct, no format errors</p> <p>B1 No frequencies correct, No format errors or One frequency correct, format errors</p> <p><i>Bar chart not attempted</i></p> <p>B2 All frequencies correctly calculated</p> <p>B1 One correct frequency seen or 360 ÷ 30 oe or 12 seen</p> <p>SC2 All frequencies in proportion, no format errors</p> <p>SC1 All frequencies in proportion, format errors</p>
<p>5(b)</p>	<p>Correct diagram</p> <p>Stem (0, 1, 2)</p> <p>Leaf (5, 7, 8; 0, 1, 1, 2, 4, 8; 3)</p>	<p>B3</p>	<p>–leoo eg, leaf or leaves not ordered each value omitted in stem or leaf value in incorrect leaf</p>

<p>6(a)(i)</p>	<p>2 lines of symmetry drawn</p>	<p>B1</p>	<p>Attempted straight lines ± 2 mm</p>
<p>6(a)(ii)</p>	<p>Rectangle</p>	<p>B1</p>	
<p>6(b)(i)</p>	<p>Rhombus drawn</p>	<p>B1</p>	<p>Attempted straight lines ± 2 mm</p>
<p>6(b)(ii)</p>	<p>Rhombus</p>	<p>B1ft</p>	<p>ft Their diagram</p>
<p>6(c)</p>	<p>Any correct statement about: Sides, Angles, Diagonals or Symmetry</p>	<p>B1</p>	<p>Must be a comparison ft Their diagram in (b) (condone Their incorrect name)</p>

<p>7(a)</p>	<p>$x + 1$</p>	<p>B1</p>	<p>or $1 + x$</p>
<p>7(b)</p>	<p>$2x$ or $2 \times x$ or $x \times 2$ or $x + x$</p>	<p>B1</p>	<p>Not x^2</p>
<p>7(c)</p>	<p>$2(x - 3)$</p>	<p>B2</p>	<p>or $2 \times (x - 3)$ or $(x - 3) \times 2$ or $2x - 6$ or $(x - 3)^2$ B1 $2x - 3$ or $x - 3 \times 2$ or $2 \times x - 3$</p>

<p>8(a)(i)</p>	<p>5 and 9 and 13</p>	<p>B2</p>	<p>B1 for 5 or 9 or 13 in correct position</p>
<p>8(a)(ii)</p>	<p>$4n + 1$ is odd and 2006 is even</p>	<p>B1</p>	<p>or eg, $4 \times 501 + 1 = 2005$ oe or $2006 - 1 = 2005$ and $2005 \div 4$ is not an integer</p>
<p>8(b)</p>	<p>$4^2 - 9$ or $16 - 9$</p>	<p>B1</p>	

9	$60 \times 300 \div 20$ or $60 \times 303 \div 20$ or $60 \times 304 \div 20$ or $59 \times 300 \div 20$	M1	20 and 60 or 300 correct or $3 \times 300, 303$ or 304 or $18000 \div 20$ or 59×15
	900 or 909 or 910 or 912 or 885	A1	From correct method
10	Reflection	B1	
	$x = -1$	B1	
11	$\frac{9}{40}$	B3	B1 for $\frac{22.5}{100}$ B2 f or $\frac{45}{200}$ or $\frac{225}{1000}$
12(a)	P at (6, 6)	B1	SC1 correctly plotted but both not labelled
12(b)	Q at (3, 6)	B1	
12(c)	$(\text{Their } 3) \times (\text{Their } 6) \div 2$	M1	$(\text{Their } 6) \times (\text{Their } 6) \div 2 - (\text{Their } 3) \times (\text{Their } 6) \div 2$ ft Their O, P and Q in any position
	9	A1ft	ft Their P and Q (equivalent difficulty only)
	cm^2	B1	Mark independently
13	$\angle BCD = 20$ or $\angle CDB = 140$ or $\angle CDA = 40$	M1	
	Calculation of $\angle ACD$ or $\angle CAD$ $(180 - 40) \div 2 = 70$	M1	oe
	90	A1	SC2 for complete verification of the assumption that $\angle ACB = 90$
14	$240 \div 12 \times 30$	M1	oe $240 \div 3000 \times 100$
	600	A1	8
	$(\text{Their } 600) \div 3000 \times 100$	M1	oe $(\text{Their } 8) \times 30 \div 12$
	20	A1ft	From $(\text{Their } 600)$ or $(\text{Their } 8)$

15(a)	$2 \times \frac{2}{5}$ or $\frac{4}{5}$	M1	oe or $\frac{1}{5}$ left over in 1 day or 2.5 meals per day
	$7 \times (\text{Their } \frac{4}{5})$	M1	oe $5 \div \frac{4}{5}$ or $5 \times \frac{5}{4}$ 1 left over in 5 days 12(.5) meals available
	$\frac{28}{5}$ and No	A1	oe (No) only lasts $6 (\frac{1}{4})$ days 14 meals required
15(b)	$\frac{14}{3} \div \frac{7}{4}$	M1	oe eg, $\frac{56}{12} \div \frac{21}{12}$ Allow one error in numerator
	$\frac{14}{3} \times \frac{4}{7}$	M1	oe
	$2\frac{2}{3}$	A1	oe eg, $2\frac{14}{21}$ or $\frac{56}{21}$ or $\frac{8}{3}$

16(a)	Straight lines joining: (10, 24), (30, 30), (50, 36), (70, 10) ±1 small square	B2	B1 for one error or not joined or joined with curve Condone straight lines from (0, 0) and (90, 0)
16(b)	$(10 \times 24) + (30 \times 30) +$ $(50 \times 36) + (70 \times 10)$	M1	or 3640 seen Allow Their consistent mid points
	$(\text{Their } 3640) \div 100$	M1	
	36.4	A1	Allow 36 if M2 scored

17(a)	$2x - 1 + 2x - 1 + x + 2 + x + 2$	B1	oe
17(b)	$(6x + 2 =) 2x + 8$	B1	Allow $(6x + 2 =) x - 1 + x - 1 + 5 + 5$ oe
	$6x - 2x = 8 - 2$	M1	oe Allow one error in signs
	$4x = 6$	A1ft	ft Only from Their $(2x + 8)$
	$1\frac{1}{2}$	B1ft	ft Their $(2x + 8)$ or Their $(4x = 6)$ oe
17(c)	$(\text{Their } 3.5) \times (\text{Their } 2)$	M1	$2x^2 + 3x - 2$
	7	A1ft	From Their x

18	$(6 + 6 + 7 + 6 + 6) \div 5$ or $(6 + 7 + 6 + 6 + 7) \div 5$	M1	
	6.2	A1	From correct method

	6.4	A1	From correct method
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19(a)	$(40 \times) 20$	M1	
	800	A1	
19(b)	Two correct attempts at dividing by a factor starting with (Their 800) eg, $2 \times 400 \checkmark$ $800 \div 5 = 160 \checkmark$ $2 \times 2 \times 200 \checkmark$ $160 \div 2 = 80 \checkmark$ or $40 \times 20 \checkmark$ $800 \div 5 = 180 \times$ $2 \times 20 \times 4 \times 5$ $180 \div 3 = 60 \checkmark$ ft $60 \div 2 = 30 \checkmark$ ft	M1	or $2^3 \times 5$ oe or factor tree for (Their 800) with two correct branches
	$2^5 \times 5^2$	A1	or $2 \times 2 \times 2 \times 2 \times 2 \times 5 \times 5$ or $2^3 \times 5 \times 2^2 \times 5$ oe

20	Attempt at 'y' / 'x'	M1	
	$a = 2$	A1	
	$b = -1$	B1	SC1 $a = -1$ and $b = 2$ SC2 for $y = 2x - 1$

21	$\pi \times 5^2$ or $\frac{1}{2} \times \pi \times 10^2$	M1	Condone use of $\pi = 3.(14\dots)$
	$\pi \times 5^2$ and $\frac{1}{2} \times \pi \times 10^2$	M1	
	(Their 50π) – (Their 25π)	M1dep	
	25	A1	

22(a)	$6x - 3 + 6x + 10$	M1	Allow one error
	$12x + 7$	A1	
22(b)(i)	$y^2 + 5y - y - 5$	M1	4 terms seen allow one error
	$y^2 + 4y - 5$	A1	
22(b)(ii)	Both $y + 5$ and $y - 1$ are E and $E \times E$ is E	B1	or y^2 is O and $4y$ is E and $O + E - O$ is E oe
22(c)	$2y(x - 3y)$	B2	B1 for $2(xy - 3y^2)$ or $y(2x - 6y)$ or one factor correct

23	$13^2 - 5^2$	M1	12.5 ÷ 5 or 2.5 or 5 ÷ 12.5 or 0.4	$\cos Z = \frac{5}{13}$
	$\sqrt{(\text{Their } 144)}$	M1dep	13 × (Their 2.5) or 13 ÷ (Their 0.4)	$12.5 \div \frac{5}{13}$
	12.5 ÷ 5 or 2.5 or 5 ÷ 12.5 or 0.4	M1	$\tan Z = \frac{12}{5}$	$(\text{Their } 32.5)^2 - 12.5^2$
	(Their 12) × (Their 2.5) or (Their 12) ÷ (Their 0.4)	M1dep	$12.5 \times \frac{12}{5}$	$\sqrt{(\text{Their } 900)}$
	30	A1		