

General Certificate of Secondary Education

Mathematics 3301 *Specification A*

Paper 2 Intermediate

Mark Scheme

2007 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.

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Dr Michael Cresswell, Director General.

Glossary for Mark Schemes

GCSE examinations are marked in such a way as to award positive achievement wherever possible. Thus, for GCSE Mathematics papers, marks are awarded under various categories.

M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
Mdep	A method mark dependent on a previous method mark being awarded.
Bdep	A mark that can only be awarded if a previous independent mark has been awarded.
ft	Follow through marks. Marks awarded following a mistake in an earlier step.
SC	Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
oe	Or equivalent. Accept answers that are equivalent. eg, accept 0.5 as well as $\frac{1}{2}$

Paper 2I

Q	Answer	Mark	Comments
1(a)	32	B1	
1(b)	Their $a \div 8$	M1	
	4	A1	
2(a)	103823	B1	
2(b)	286(.29151)	B1	
3(a)	4, No, 1, 2	B3	-1 eooo
3(b)	Kite	B1	
4	(1, -2) (1, -3) (3, -3)	B2	B1 For any 90° rotation B1 For (-1, 2) (-1, 3) (-3, 3)
5	$360 - 90 - 120 - 100$ for ADC	M1	50
	$180 - \text{Their } 50$	M1dep	
	130	A1	
6(a)	$\pi \times 2.7^2$	M1	
	22.9	A1	23, 22.89
6(b)(i)	(0).8(0)	B1	
6(b)(ii)	$80 \times 60 \div 100 \div 100$	M1	
	(0).48	A1	
7(a)	131 ± 2	B1	
7(b)	Either bearing correct	B1	Within $\frac{1}{2}$ sq of intersection of grid lines
	Correct intersection	B1	Within $\frac{1}{2}$ sq of intersection of grid lines

Q	Answer	Mark	Comments
8(a)	$6 + 2 \times 4 + 3 \times 3 + 4 \times 7 + 5 \times 6$	M1	At least 3 multiplications and adds seen or 85
	Their $81 \div 30$	M1dep	
	2.7	A1	
8(b)	$\frac{13}{30}$	B2	0.43, 43% B1 For prob. $\frac{x < 30}{30}$, $\frac{2}{6}$ is B0
9	$7a$	B1	
	$8a + 8b$	B1	
	$200 - 6b$	B1	SC2 For all correct but no arrows
10(a)	Grant	B1	
10(b)	93	B1	
10(c)	$(32 \text{ to } 37) \div 30$	M1	
	1.07 to 1.13	A1	SC1 $30 \div 28 = 1.07$
10(d)(i)	Mark	B1	
10(d)(ii)	His line is steeper	B1	oe Mark is overtaking
11	$900/3 + 2 \times 900/5$	M1	$\frac{2}{5} + \frac{1}{3}$, $\frac{3}{8}$ on its own is M0
	660 or 240	A1	$\frac{11}{15}$ oe 0.733
	$\frac{900 - \text{Their } 660}{900}$	M1dep	oe $1 - \text{Their } \frac{11}{15}$, 0.267
	$\frac{4}{15}$	A1	

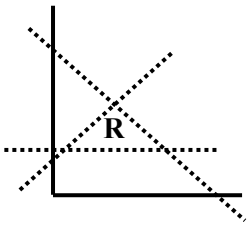
Q	Answer	Mark	Comments
12(a)	$1400 + ? = 1800$	M1	oe
	400	A1	SC1 4 or £4
12(b)	$2? + 1200 = 2460$	M1	oe
	630	A1	SC1 For 63 or 6.3

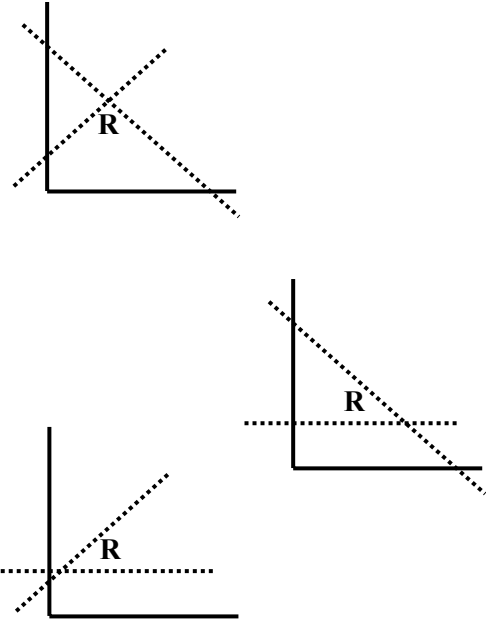
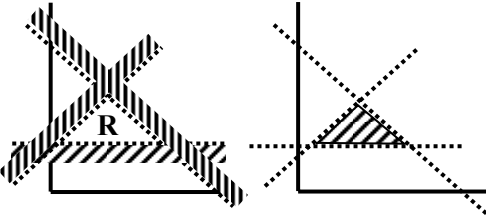
Allow embedded answers unless contradicted when M marks only

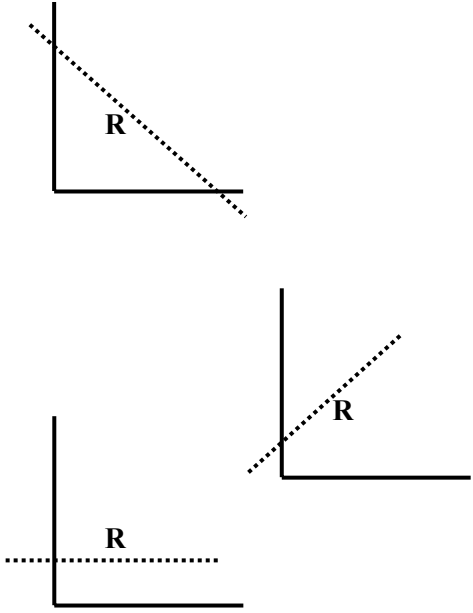
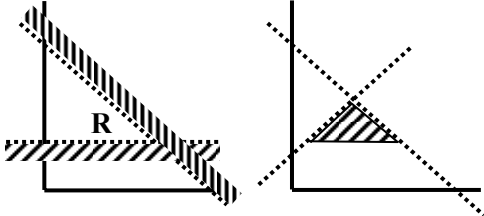
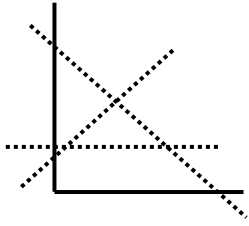
13(a)	$7c + 2d$	B2	B1 For each
13(b)	$46 = 6 \times 4 + 2W$	M1	
	$46 - \text{Their } 24 (= 2W)$	M1dep	22
	11	A1	
13(c)(i)	$5w = 41 + 4$	M1	$w - \frac{4}{5} = \frac{41}{5}$
	9	A1	
13(c)(ii)	$8x - 28 = 12$	M1	$2x - 7 = 3$ Allow 1 error in 1 st or 2 nd line
	$8x = 40$	M1dep	$2x = 10$
	5	A1	
13(c)(iii)	$y - 63 = 14$	M1	$(\frac{y}{7} =) 11$ $y - 9 = 14$ is M0
	77	A1	

14(a)	202 or 203	B1	
14(b)	92	B1	
14(c)	$197 - 170$	B1	27, $197/170(\times 100)$ M1
	$\text{Their } 27/170 \times 100$	M1dep	115.88, 115.9, 116 A1
	15.88...	A1	15.9, 16 with working

Q	Answer	Mark	Comments
15	Trial above 3.7446 evaluated	M1	$4 \rightarrow 72$, $3.9 \rightarrow 67.119$, $3.8 \rightarrow 62.472$
	Trial below 3.7446 evaluated	M1	$3.7 \rightarrow 58.053$, $3.6 \rightarrow 53.856$, $3.5 \rightarrow 49.875$, $3 \rightarrow 33$
	Testing a value that justifies 3.7 as answer 3.745 to 3.75 inclusive	M1dep	$3.75 \rightarrow 6023\dots$ Dep. on both M mark $3.745 \rightarrow 60.01$
	3.7	A1	All values to at least 1 dp rounded or truncated
16(a)	1.25	B1	$1\frac{1}{4}$ oe
16(b)(i)	23.761536(42...)	B1	
16(b)(ii)	23.76, 23.8, 24	B1ft	Ft From any value ≥ 4 sf rounded to 2 or 3 sf or 2dp
17(a)	$15/100 \times 8400$	M1	1260 or 0.85 seen
	$8400 - \text{Their } 1260$	M1dep	8400×0.85
	7140	A1	6300 treat as MR 75% can score 2/3
17(b)	0.85 seen	B1	85%
	$12512 \div (0.85 \text{ or digits } 85)$	M1	oe $1\% = 12512 \div 85 (=147.2)$
	14720	A1	16682.67 treat as MR 75% can score 2/3
18(a)	Arc from P cutting road twice	M1	
	Arcs on other side of line	M1	or Same side above or below P
	Completion of perpendicular	A1	
18(b)	$0.5 \times \text{Their perp.}$	M1	
	2.9 to 3.1 inclusive	A1	SC1 5.8 to 6.2
19(a)	Plotting at midpoints	M1	Bar chart gets M1 only Allow 1 error
	Fully correct	A1	Ignore plots < 142 and > 162
19(b)	$148 < h \leq 152$	B1	

Q	Answer	Mark	Comments
20	Sight of cos	M1	or sin 55
	$18 \times \cos 35$	M1dep	M2 For full method eg, sine and Pythag.
	14.7....	A1	15 with working
21	(Digits 85) ³	M1	0.614 or digits 614
	Any power of 10 \div (Their digits 85) ³	M1dep	
	1628 to 1629	A1	1630 with working, digits 1628 to 1629 M2
22(a)	0.3, 0.3, 0.7, 0.3	B1	
22(b)	0.7×0.3	M1	0.21, mult. any one of Their green \times Their yellow
	2×0.21	M1dep	Addition of both Their green \times Their yellow M2 $1 - 0.7^2 - 0.3^2$
	0.42	A1ft	oe ft Only if each pair of probs. add to one
23(a)	$x > 2$	B1	
23(b)		B3	
	<p>All lines correct, drawn dashed, R marked</p> 	3 marks	NB Solid lines should be considered incorrect for 1 mark loss

Q	Answer	Mark	Comments
	<p>R marked correct relative to two correct dashed lines 3rd line incorrect or missing</p> 	2 marks	<p>NB Solid lines should be considered incorrect for 1 mark loss</p>
	<p>All lines correct, drawn dashed, shaded in or out, R not marked</p> 	2 marks	<p>NB Solid lines should be considered incorrect for 1 mark loss</p>

Q	Answer	Mark	Comments
	<p>R marked correct relative to one correct dashed line other lines incorrect or missing</p> 	1 mark	<p>NB Solid lines should be considered incorrect for 1 mark loss</p>
	<p>Two lines correct, drawn dashed, shaded in or out, R not marked</p> 	1 mark	<p>NB Solid lines should be considered incorrect for 1 mark loss</p>
	<p>All lines correct, drawn dashed, no shading, R not marked</p> 	1 mark	<p>NB Solid lines should be considered incorrect for 1 mark loss</p>

Q	Answer	Mark	Comments
24(a)	$2.99(4) \times 10^{-23}$ or 3×10^{-23}	B2	2.9×10^{-23} is B1 B1 For digits 299(4) B1 For partial working 0.334×10^{-23} , 26.6×10^{-24}
24(b)	$1 \div$ Their a	M1	Correct but not in sf eg, 0.334×10^{-23}
	$3.3... \times 10^{22}$	A1	3×10^{22} with working