Version 1.0

General Certificate of Secondary Education

Mathematics (Linear) B
4365

Paper 2 Higher Tier

Mark Scheme

Specimen Paper

Mark Schemes

Principal Examiners have prepared these mark schemes for specimen papers. These mark schemes have not, therefore, been through the normal process of standardising that would take place for live papers.

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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.
Q	Marks awarded for quality of written communication.
M dep	A method mark dependent on a previous method mark being 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 $\frac{1}{2}$

Higher Tier

Q	Answer	Mark	Comments
1	C, F, T, T All correct	B3	
	3 correct	B2	
	2 correct	B1	
2	Identifying any number whose digits have a sum of 9 other than 18	M1	2 + 7 = 9 etc.
	Identifying the 9 times table	A1	
	9	A1	
3(a)	18 245 – 8500	M1	
	Their 9745 ÷ 5 or 1949	M1	
	1950	A1	
3(b)	8500 – (their) 1950	M1	
	6550	A1ft	
4(a)	6.790566…	B1	
4(b)	7 or 6.8	B1ft	1 or 2 sf from their 4(a)
5	$x + 3 = 8$ or $x = 5$	M1	oe $x + 3 + 8 = x - 1$ + PQ for M2
	(32 – their 4 – their 4) ÷ 2	M1	
	12	A1	
	Must use square to find x and then use their x in oblong to find PQ	Q1	QWC Strand (iii) – To achieve a correct solution , a clear and organised approach must be evident

Q	Answer	Mark	Comments
6	P(13) = $\frac{3}{20}$ implies 15 winners in 100 plays	B1	Award partial marks for stages shown
	(Chocolate costs) £7.50	B1	
	(Takings) 100 × 20 (= £20)	B1	
	(Profit) £20 – £7.50 (= £12.50)	B1	
7(a)	$\frac{195 + 210}{2}$	M1	oe eg, $\frac{195 + 15}{2}$
	= 202.5	A1	
7(b)	165 – 30	M1	oe
	135	A1	
8(a)(i)	(£)25	B1	
8(a)(ii)	150 (minutes)	B1	
8(b)	500 – 150 (or 350) **or** 43 – 25 (or 18)	M1	oe Allow data from any two points
	Their 18 ÷ 350 (× 100)	M1	oe or 0.05(1…) seen
	5.1 (pence)	A1	
9	(x =) 55°	B1	
	(y =) 55°	B1	
	180 – 55 – their y	M1	
	(z =) 70°	A1 ft	

Q	Answer	Mark	Comments
10(a)	(2, 73) circled	B1	
	Indicates away from pattern	B1	oe Not close to line of best fit Outlier
10(b)	Best fit line drawn	B1	From (1, 15) – (1, 25) To (5, 65) – (5, 80)
10(c)(i)	Read off at 4 using their line of best fit	M1	eg, 52 Allow 54 to 62 with no line of best fit
	Their 52 – 40	A1	eg, 12
10(c)(ii)	Quite a small sample or mention of any other variable that could confound	B1	oe
11	14 ÷ 10 (or 1.4)	M1	70 × 10 (or 700)
	5 × 70 **or** 210 × (their) 1.4	M1	5 × (their) 700 **or** 210 × 14
	5 × 70 – 210 × (their) 1.4 (= 56)	M1	5 × (their) 700 – 210 × 14 (= 560)
	(their) 56 ÷ (their 1.4)	M1	(their) 560 ÷ (their 14)
	40	A1	
Alt 11	14 ÷ 10 (or 1.4)	M1	70 × 10 (or 700)
	70 ÷ (their) 1.4 (= 50)	M1	(their) 700 ÷ 14 (= 50)
	5 × (their) 50 (= 250)	M1	
	(their) 250 – 210	M1	
	40	A1	
12(a)	Points plotted accurately	B1	$\pm\frac{1}{2}$ square
	Smooth curve through correct plots	B1	$\pm\frac{1}{2}$ square
12(b)	$x = 1.7$	B1	Allow 1.6 - 1.8

Q	Answer	Mark	Comments
13	6 × 2 (× 1) or 12	B1	
	12 × 1.25	M1	
	15 × 49.50 (+ 30) or 5 × 67.50 (+ 430) (= 337.50)	M1	
	(£) 742.50 or (£) 772.50	A1	
	(£) 767.50	A1	
	Separate working seen for both companies and choice clearly made that follows from their working	Q1	Strand (iii) An organised response leading to a correct conclusion
14(a)(i)	Too vague	B1	oe
14(a)(ii)	Not enough choices or choices overlap	B1	oe
14(b)	Response section that covers values from 0 to at least 5 with no missing values and no overlapping values	B1	
15	2.6×10^{10}	B2	B1 For $2.6 \times 10^{\text{any power}}$ or any equivalent correct answer not in SF form
16(a)	$3x - x > 8 - 7$	M1	
	$x > \frac{1}{2}$	A1	oe
16(b)	$a + 3 = b^2$	M1	
	$a = b^2 - 3$	A1	
16(c)	LCM of 12 used correctly or attempt at LHS multiplied by 12	M1	
	$6x + 9 + 4x - 20$	M1	Allow one error
	$10x - 11 = 18$	A1	$10x - 11 = 3$ scores A0
	2.9	A1 ft	ft From **one** arithmetic error but **not** from $10x - 11 = 3$

Q	Answer	Mark	Comments
17(a)	Drawing diagonals of new square Showing clearly the 4 ≡ shapes	Q2	QWC Strand (iii) 2 marks for a full and clearly set out solution 1 mark for a partial or unclear solution
17(a) Alt 1	$\frac{1}{2} \times 10 \times 10$ (= 50) Their 50 × 4 = 200 and is $\frac{1}{2}$ of 400	Q2	QWC Strand (iii) 2 marks for a full and clearly set out solution 1 mark for a partial or unclear solution
17(a) Alt 2	Pythagoras showing side of square is √200 √200 × √200 = 200 is $\frac{1}{2}$ of 400	Q2	QWC Strand (iii) 2 marks for a full and clearly set out solution 1 mark for a partial or unclear solution
17(b)	$\pi \times 10^2$ (= 314)	M1	
	$\frac{\text{Their } 314}{400} \times 100$	M1	
	78.5, so no	A1	
17(c)	4 quadrants (radius 10) = circle in part (b) (radius 10)	Q1	QWC Strand (i) Must use quadrants or quarter circles
18(a)	Evidence that line at 108 drawn or used	M1	Line from 7weeks drawn or used
	On or under 7 weeks	A1	108 patients
	True as 90% wait just under 7 weeks or True as at 7 weeks, just over 90% have been seen	A1	Must make a conclusion and refer to values
18(b)	80 ÷ 746 (× any value in table)	M1	
	9 37 5 4 21 4 All values ± 1	A2	Award A1 A0 if total is not 80

Q	Answer	Mark	Comments
19	Use of cosine rule to find any angle Cos $A = \frac{6^2 + 10^2 - 14^2}{2 \times 6 \times 10}$ Cos $B = \frac{6^2 + 14^2 - 10^2}{2 \times 6 \times 14}$ Cos $C = \frac{10^2 + 14^2 - 6^2}{2 \times 10 \times 14}$	M1	
	Correct value for Cos of angle Cos $A = -0.5$ Cos $B = 0.7857...$ Cos $C = 0.9285...$	A1	
	Angle $A = 120$, $B = 38.2$ and $C = 21.8$	A1	
	Use of $\frac{1}{2}ab \sin C$	M1	
	Area = 26	A1	
20	$\frac{1}{6}$, $\frac{5}{6}$, $1 - p$, $1 - p$ marked on tree diagram	B1	
	$\frac{1}{6}(1 - p) + \frac{5}{6}p = \frac{7}{9}$	M1	
	$\frac{1}{6} - \frac{1}{6}p + \frac{5}{6}p = \frac{7}{9}$	M1	
	$\frac{4}{6}p = \frac{7}{9} - \frac{1}{6}$	A1	
	$p = \frac{11}{12}$	A1	
21	Correct sketch graph	B1	Key points (0°, 1) (90°, 0) (180°, –1) (270°, 0) (360°, 1)
	Correct sketch graph	B1	Key points (0°, 0) (90°, $\frac{1}{2}$) (180°, 0) (270°, $-\frac{1}{2}$) (360°, 0)
	Correct sketch graph	B1	Key points (0°, 0) (180°, 1) (360°, 0)

Q	Answer	Mark	Comments
22(a)	$4.2 \times 5/3$	M1	oe
	7	A1	
22(b)	$45 \times (4/3)^2$	M1	
	80	A1	
22(c)	$(6/2)^3$	M1	oe
	27	A1	
23	$n^2 + 5n + 5n + 25 - (n^2 + 3n + 3n + 9)$	M1	Allow invisible bracket
	$n^2 - n^2 + 10n - 6n + 25 - 9$	A1	Must show that the minus sign has been properly dealt with
	Either $4n + 16 = 4(n + 4)$ or $4(n + 4) = 4n + 16$	Q1	This must be stated clearly QWC Strand (ii) - A structured argument using accurate mathematical language
Alt 23	Attempt at difference of two squares	M1	
	$(n + 5 + n + 3)(n + 5 - n - 3)$	A1	
	$(2n + 8)(2)$	Q1	QWC Strand (ii) - A structured argument using accurate mathematical language
24(a)	$-2\boldsymbol{a} + \boldsymbol{a} + 2\boldsymbol{b} + 1\frac{1}{2}\ \boldsymbol{a} - \boldsymbol{b}$	M1	oe
	$\frac{1}{2}\boldsymbol{a} + \boldsymbol{b}$	A1	
24(b)	Trapezium	M1	oe
	$\overrightarrow{SR} = \frac{1}{2}\ \overrightarrow{PQ}$, so parallel	A1	