

GCSE Mathematics (1MA1)

Themed papers – Statistical Diagrams: Tree Diagrams

Compiled from student-friendly mark schemes

Please note that this mark scheme is not the one used by examiners for making scripts. It is intended more as a guide to good practice, indicating where marks are given for correct answers. As such, it doesn't show follow-through marks (marks that are awarded despite errors being made) or special cases.

It should also be noted that for many questions, there may be alternative methods of finding correct solutions that are not shown here – they will be covered in the formal mark scheme.

NOTES ON MARKING PRINCIPLES

Guidance on the use of codes within this mark scheme

M1 – method mark. This mark is generally given for an appropriate method in the context of the question. This mark is given for showing your working and may be awarded even if working is incorrect.

P1 – process mark. This mark is generally given for setting up an appropriate process to find a solution in the context of the question.

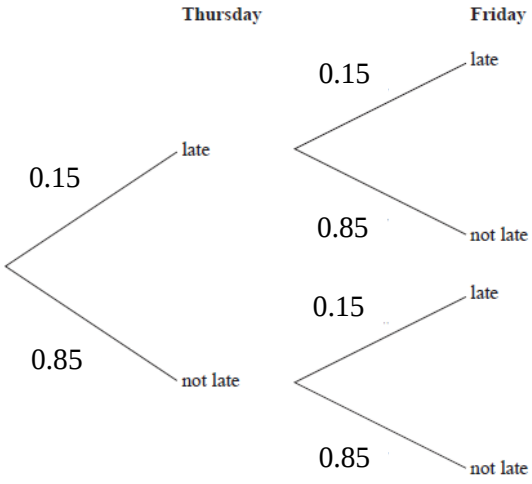
A1 – accuracy mark. This mark is generally given for a correct answer following correct working.

B1 – working mark. This mark is usually given when working and the answer cannot easily be separated.

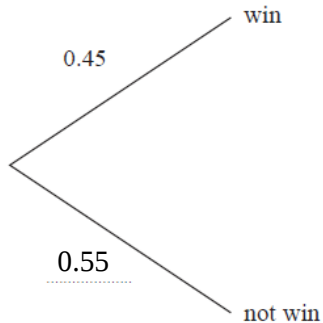
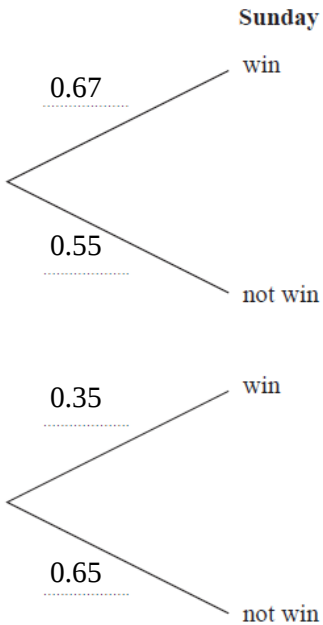
C1 – communication mark. This mark is given for explaining your answer or giving a conclusion in context supported by your working.

Some questions require all working to be shown; in such questions, no marks will be given for an answer with no working (even if it is a correct answer).

Question 1 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$1 - 0.15 = 0.85$	M1	This mark is given for finding the probability of 'not late'
	 The diagram shows a probability tree for two days: Thursday and Friday. On Thursday, there are two branches: 'late' with probability 0.15 and 'not late' with probability 0.85. From the 'late' branch on Thursday, there are two branches for Friday: 'late' with probability 0.15 and 'not late' with probability 0.85. From the 'not late' branch on Thursday, there are two branches for Friday: 'late' with probability 0.15 and 'not late' with probability 0.85.	A1	This mark is given for a fully correct diagram
(b)	$0.85 \times 0.85 = 0.7225$	M1	This mark is given for a method to find the probability of being not late on both days
	$1 - 0.7225$	M1	This mark is given for a method to find the probability that Mary's train will be late on at least one of the two days
	0.2775	C1	This mark is given for the correct answer only

Question 2 (Total 5 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$1 - 0.45 = 0.55$ 	B1	This mark is given for finding the probability of not winning on Saturday in correct position
	$1 - 0.67 = 0.33$ $1 - 0.35 = 0.65$ 	B1	This mark is given for the branches for the Sunday game correct
(b)	$0.45 \times 0.33 = 0.1485$ $0.55 \times 0.35 = 0.1925$	M1	This mark is given for finding the probability of one win on Saturday and not on Sunday and a win on Sunday but not on Saturday
	$0.1485 + 0.1925$	M1	This mark is given for a correct method to find the total probability
	0.341	A1	This mark is given for the correct answer only

Question 3 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$0.07 \times 0.98 = 0.0686$ $0.93 \times 0.11 = 0.1203$	M1	This mark is given for one correct product seen
	$0.0686 + 0.1203$	M1	This mark is given for a fully correct method to calculate the probability
	0.1709	A1	This mark is given for the correct answer only

Question 4 (Total 3 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$0.25 \times 0.6 = 0.15$ $0.75 \times 0.4 = 0.3$	1	This mark is given for finding the probability that both spinners land on red and the probability that both spinners land on white
	$\frac{24}{0.15} = 160$	1	This mark is given for finding how many time Alan spins both spinners
	$160 \times 0.3 = 48$	1	This mark is given for the correct answer only

Question 5 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
	$\frac{4}{7}, \frac{3}{7}$	B1	This mark is given for two correct answers only
	$\frac{3}{8}, \frac{5}{8}, \frac{3}{8}, \frac{5}{8}$	B1	This mark is given for four correct answers only
	$\frac{3}{7} \times \frac{5}{8}$	M1	This mark is given for a method to find the probability of two red pens
	$\frac{15}{56}$	A1	This mark is given for a correct answer only

Question 6 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	$\frac{1}{6}$ and $\frac{5}{6}$ on left hand branches	B1	This mark is given for the correct answers only,
	$\frac{1}{8}$, $\frac{7}{8}$, $\frac{1}{8}$ and $\frac{7}{8}$ on right hand branches	B1	This mark is given for the correct answers only
(b)	$\frac{5}{6} \times \frac{7}{8} =$	M1	This mark is given for a method to find the probability that neither dice will land on 6
	$\frac{35}{48}$	A1	This mark is given for the correct answer only

Question 7 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	First spin: $\frac{3}{4}$, $\frac{1}{4}$ Second spin: $\frac{3}{4}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{4}$	B2	This mark are given for finding all six probabilities correctly (B1 given for finding four of the probabilities correctly)
(b)	$\frac{3}{4} \times \frac{1}{4}$	M1	This mark is given for finding a method to work out the combined probability
	$\frac{3}{16}$	A1	This mark is given for the correct answer only

Question 8 (Total 4 marks)

Part	Working or answer an examiner might expect to see	Mark	Notes
(a)	0.2, 0.8, 0.35, 0.65, 0.15, 0.85	B2	2 marks are given for finding all six probabilities correctly (B1 given for finding at least 2 of the probabilities correctly)
(b)	$0. \times 0.35$ or 0.8×0.15 or $0.2 \times 0.65 + 0.8 \times 0.85$	M1	
	$0.2 \times 0.35 + 0.8 \times 0.15$ or $1 - (0.2 \times 0.65 + 0.8 \times 0.85)$	M1	
	0.19	A1	This mark is given for the correct answer or a correct equivalent e.g. $\frac{19}{100}$ or 19%

Mark scheme for 1MA1 Higher themed papers: Statistical Diagrams: Tree Diagrams

Performance data:

Q	Taken from			Total Marks available	TOPIC	Spec Ref	AO	% Mean marks	Edexcel mean averages Marks of candidates who achieved grade:										
	Q	Series	Paper						ALL	9	8	7	6	5	4	3	2	1	U
1a	10a	June 2019	2H	2	Probability	P6, P4	2	97	1.94	1.99	1.99	1.99	1.97	1.93	1.84	1.67	-	-	1.30
1b	10b	June 2019	2H	3	Probability	P6, P8	1	58	1.73	2.80	2.53	2.18	1.78	1.25	0.69	0.31	-	-	0.14
2a	15a	June 2018	2H	2	Probability	P8, P9	3	96	1.92	1.99	1.97	1.96	1.95	1.92	1.86	1.68	-	-	1.25
2b	15b	June 2018	2H	3	Probability	P8, P9	2	65	1.96	2.92	2.81	2.63	2.24	1.57	0.82	0.33	-	-	0.13
3	11	Nov 2019	3H	3	Probability	P6	1	38	1.14	3.00	2.62	2.57	2.24	1.57	0.67	0.24	-	-	0.04
4	12	Nov 2017	3H	3	Probability	P3, P8	3	21	0.64	2.75	2.44	2.59	2.08	1.18	0.52	0.25	-	-	0.10
5a	8a	Mock Set 1	3H	2	Probability	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5b	8b	Mock Set 1	3H	2	Probability	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6a	6a	Mock Set 2	1H	2	Probability	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6b	6b	Mock Set 2	1H	2	Probability	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7a	4a	Mock Set 3	2H	2	Probability	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7b	4b	Mock Set 3	2H	2	Probability	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8a	13a	Mock Set 4	3H	2	Probability	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8b	13b	Mock Set 4	3H	3	Probability	-	-	-	-	-	-	-	-	-	-	-	-	-	-
				33					9.33	15.45	14.36	13.92	12.26	9.42	6.4	4.48	-	-	2.96