PEARSON EDEXCEL INTERNATIONAL GCSE MATHEMATICS A (4MA1) · HIGHER TIER

Tree Diagrams and Conditional Probability: exam questions

10 questions · 27 marks · mark schemes at the end

Name _____ Date _____ Score / 27

- Calculators are allowed on both 4MA1 Higher papers (1H and 2H). Show your working: most marks are for method.
- Mark schemes start after the questions. M marks are for a correct method, A marks for an accurate answer that follows a correct method, and B marks for a correct result on its own.
- Online, with more practice: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/tree-diagrams-and-conditional-probability

1. **3 marks**

The probability that it rains on Monday is 0.3. If it rains, the probability that Jo is late for work is 0.4. If it does not rain, the probability that she is late is 0.1.

Work out the probability that Jo is late for work on Monday.

2. **2 marks**

The probability that it rains on Monday is 0.3. If it rains, the probability that Jo is late for work is 0.4. If it does not rain, the probability that she is late is 0.1.

Jo is late for work on Monday. Work out the probability that it rained.

3. **3 marks**

Bag A holds 3 red and 2 blue counters. Bag B holds 4 red and 4 blue counters. One counter is taken at random from each bag.

Work out the probability that exactly one of the counters is red.

4. **3 marks**

A box holds 7 red pens and 3 green pens. Two pens are taken at random without replacement.

Work out the probability that at least one of the pens is green.

5. **2 marks**

Of 80 students, 30 study French, 25 study Spanish and 10 study both.

A student who studies Spanish is chosen at random. Work out the probability that this student also studies French.

6. **3 marks**

The probability that Sam passes his driving test at the first attempt is 0.6. If he fails, the probability that he passes at the second attempt is 0.7.

Work out the probability that Sam passes within his first two attempts.

7. **2 marks**

A box holds 4 red balls and 6 blue balls. Three balls are taken at random without replacement.

Work out the probability that all three balls are blue.

8. **3 marks**

A drawer holds 5 black socks and 7 white socks. Two socks are taken at random without replacement.

Work out the probability that the two socks are the same colour.

9. **4 marks**

A bag holds 6 red counters and 4 yellow counters. Two counters are taken at random without replacement.

Given that the second counter is red, work out the probability that the first counter was red.

10. **2 marks**

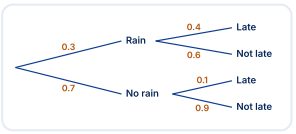
The probability that a train is late on any day is 0.2, independently of other days.

Work out the probability that the train is late on exactly one of two days.

Answers and worked solutions

Question 1

3 marks



M1 $0.3 \times 0.4 = 0.12$

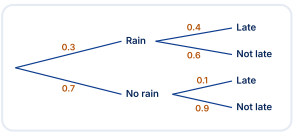
M1 $0.7 \times 0.1 = 0.07$

A1 0.19

Answer: 0.19

Question 2

2 marks



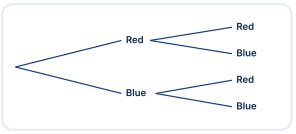
M1 $\dfrac{0.12}{0.19}$

A1 $\dfrac{12}{19}$

Answer: $\dfrac{12}{19}$

Question 3

3 marks



M1 $\dfrac{3}{5} \times \dfrac{1}{2}$ or $\dfrac{2}{5} \times \dfrac{1}{2}$

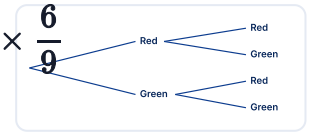
M1 $\dfrac{3}{10} + \dfrac{2}{10}$

A1 $\dfrac{1}{2}$

Answer: $\dfrac{1}{2}$

Question 4

3 marks



M1 $P(\text{both red}) = \dfrac{7}{10} \times \dfrac{6}{9}$

M1 $1 - \dfrac{42}{90}$

A1 $\dfrac{8}{15}$

Answer: $\dfrac{8}{15}$

Question 5

2 marks

M1 $\dfrac{10}{25}$

A1 $\dfrac{2}{5}$

Answer: $\dfrac{2}{5}$

Question 6

3 marks



M1 $0.4 \times 0.7 = 0.28$

M1 $0.6 + 0.28$

A1 0.88

Answer: 0.88

Question 7

2 marks

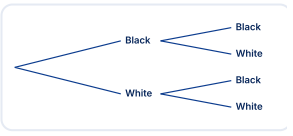
M1 $\dfrac{6}{10} \times \dfrac{5}{9} \times \dfrac{4}{8}$

A1 $\dfrac{1}{6}$

Answer: $\dfrac{1}{6}$

Question 8

3 marks



M1 $\dfrac{5}{12} \times \dfrac{4}{11}$ or $\dfrac{7}{12} \times \dfrac{6}{11}$

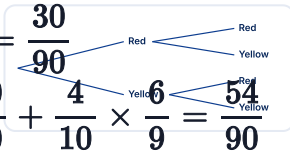
M1 $\dfrac{20}{132} + \dfrac{42}{132}$

A1 $\dfrac{31}{66}$

Answer: $\dfrac{31}{66}$

Question 9

4 marks



M1 $P(\text{RR}) = \dfrac{6}{10} \times \dfrac{5}{9} = \dfrac{30}{90}$

M1 $P(\text{second red}) = \dfrac{30}{90} + \dfrac{4}{10} \times \dfrac{6}{9} = \dfrac{54}{90}$

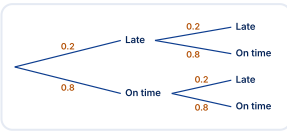
M1 $\dfrac{30}{90} \div \dfrac{54}{90}$

A1 $\dfrac{5}{9}$

Answer: $\dfrac{5}{9}$

Question 10

2 marks



M1 0.2×0.8 or 0.8×0.2

A1 0.32

Answer: 0.32

Online, with every solution: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/tree-diagrams-and-conditional-probability

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