



3.19H Frequency Trees: Higher Tier Practice

EDEXCEL Edexcel 1MA1 · Calculator allowed · about 75 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** A school runs a trial of two revision methods, X and Y. 60% of students try method X and 40% try method Y. Of those using X, 70% improve their grade. Of those using Y, 50% improve. Using a frequency tree starting with 1000 students, work out how many students improve after trying method Y, and how many students improve in total.

- (a) Using 1000 students as the starting frequency, work out how many students improve after trying method Y. (2)

- (b) Using the same 1000 students, work out the total number of students who improve (from both methods). (2)

(Total for Question 1 is 4 marks)

- 2** In a survey 300 people are asked whether they exercise regularly and whether they take a vitamin supplement. The frequency tree starts with 300 people: 60% exercise regularly. Of those who exercise, 30% take a supplement. Of those who do not exercise, 10% take a supplement.

Complete the frequency tree values and find the probability that a randomly chosen person both exercises regularly and takes a supplement. Give your answer as a fraction in lowest terms.

- (a) Complete the frequencies on the tree (write the four end frequencies). (2)

- (b) Write down the probability that a randomly chosen person both exercises regularly and takes a supplement, giving your answer as a fraction in lowest terms. (2)

3 A medical trial tests a new treatment. Out of 200 patients, 40% receive the treatment and 60% receive a placebo. Of those receiving the treatment, 75% show improvement. Of those receiving placebo, 20% show improvement.

(a) Complete a frequency tree showing actual frequencies.

(b) Calculate the probability that a randomly chosen patient shows improvement.

(c) Given a patient shows improvement, calculate the probability they were in the treatment group. Give your answer as a fraction in lowest terms.

(a) (a) Complete the frequency tree with actual numbers. (1)

(b) (b) Calculate the probability that a randomly chosen patient shows improvement. (2)

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(c) (c) Given a patient shows improvement, calculate the probability they were in the (2)
treatment group. Give your answer as a fraction in lowest terms.

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(Total for Question 3 is 5 marks)

4 A college runs morning and evening exam sessions. 20% of the 500 candidates sit the morning session and the rest sit in the evening. 60% of evening candidates pass. Let p be the proportion of morning candidates who pass. If the total number of passes is 290, work out p as a percentage.

(a) Set up an equation for the total number of passes in terms of p , then solve for p . (4)
Give p as a percentage to the nearest whole percent.

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(Total for Question 4 is 4 marks)

Mark scheme · 3.19H Frequency Trees: Higher Tier Practice

Question 1

- (a) **M1** select 40% of 1000 and apply 50% to that group (method shown)
- (a) **A1** 200 cao
- (a) **Answer: 200**
- (b) **M1** find improves from X: $1000 \times 0.60 \times 0.70 = 420$ or method shown
- (b) **A1** 620 cao
- (b) **Answer: 620**

Question 2

- (a) **M1** correct method to compute each branch from 300
- (a) **A1** all four end frequencies correct integers cao
- (a) **Answer: Exercise and supplement 54; exercise and no supplement 126; no exercise and supplement 12; no exercise and no supplement 108.**
- (b) **M1** use of frequency $54 / 300$ or equivalent
- (b) **A1** $9/50$ cao
- (b) **Answer: $9/50$**

Question 3

- (a) **B1** treatment 80, placebo 120 shown
- (a) **Answer: Treatment group 80; Placebo 120.**
- (b) **M1** compute improves: $80 \times 0.75 = 60$ and $120 \times 0.20 = 24$ or equivalent
- (b) **A1** $84/200 = 21/50$ cao
- (b) **Answer: $21/50$**
- (c) **M1** use conditional probability: $60 / 84$ or equivalent shown
- (c) **A1** $5/7$ cao
- (c) **Answer: $5/7$**

Question 4

- (a) **M1** construct equation: $500 \times 0.20 \times p + 500 \times 0.80 \times 0.60 = 290$ or equivalent
- (a) **M1** rearrange and solve: $100p + 240 = 290 \rightarrow 100p = 50$
- (a) **A1** $p = 0.5$ cao
- (a) **A1** $p = 50\%$ cao
- (a) **Answer: 50%**