MEMORANDUM

Name: ..... Class: .....

Date: .....

MARK ____ / 29

Answer all questions. Show all your working — marks are awarded for method as well as the final answer. **Teacher copy: accept any correct equivalent method.**

1 How many 4-digit PINs can be formed if digits may repeat? (2)

$10^4 = \mathbf{10\,000}$ ✓✓ (2)

2 How many 4-digit PINs can be formed if no digit may repeat? (2)

$10 \times 9 \times 8 \times 7 = \mathbf{5\,040}$ ✓✓ (2)

3 In how many ways can 5 different books be arranged on a shelf? (1)

$5! = \mathbf{120}$ ✓ (1)

4 4 boys and 3 girls sit in a row. In how many ways can they sit if the girls sit together? (3)

$5! \times 3! = 120 \times 6 = \mathbf{720}$ ✓✓✓ (3)

5 For those 7 learners, calculate the probability that the girls sit together. (2)

$\frac{720}{5\,040} = \mathbf{\frac{1}{7}}$ ✓✓ (2)

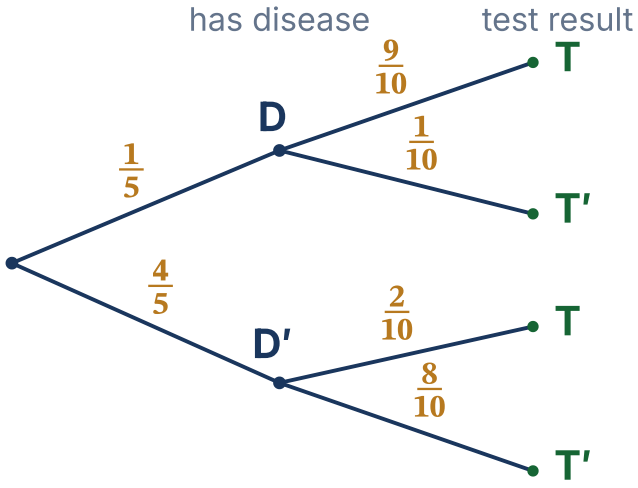
6 How many arrangements are there of the letters of the word LETTER? (3)

$\frac{6!}{2! \times 2!} = \mathbf{180}$ ✓✓✓ (3)

7 Write down the value of 0! (1)

1 ✓ (1)

8 Using the tree diagram below, calculate the probability that a person tests positive. (3)



$\frac{1}{5} \times \frac{9}{10} + \frac{4}{5} \times \frac{2}{10} = \mathbf{0{,}34}$ ✓✓✓ (3)

9 Of 80 learners: 40 play soccer, 32 play cricket, 28 play tennis; 15 play soccer and cricket, 12 soccer and tennis, 10 cricket and tennis, and 6 play all three. How many play none? (4)

Centre 6 ✓; pairs only 9, 6, 4 ✓; singles: soccer $40 - 9 - 6 - 6 = 19$, cricket $32 - 9 - 4 - 6 = 13$, tennis $28 - 6 - 4 - 6 = 12$ ✓; at least one $= 19 + 13 + 12 + 9 + 6 + 4 + 6 = 69$; none $= 80 - 69 = 11$ ✓ (4)

10 In a group of 150 people, 90 are female and 60 wear glasses, of whom 40 are female. Determine whether 'female' and 'wears glasses' are independent. (4)

P(F) $= \frac{90}{150} = 0{,}6$ ✓; P(G) $= \frac{60}{150} = 0{,}4$ ✓; P(F and G) $= \frac{40}{150} = 0{,}267$ ✓; P(F) × P(G) $= 0{,}24 \neq 0{,}267$, so NOT independent ✓ (4)

11 State the test for two events being independent. (2)

P(A and B) = P(A) × P(B) ✓✓ (2)

12 Why must a three-event Venn diagram be filled from the centre outwards? (2)

Each pairwise total already includes those in all three ✓; starting at the centre lets you subtract that overlap so nobody is counted twice ✓ (2)

TOTAL: 29 marks

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