MEMORANDUM

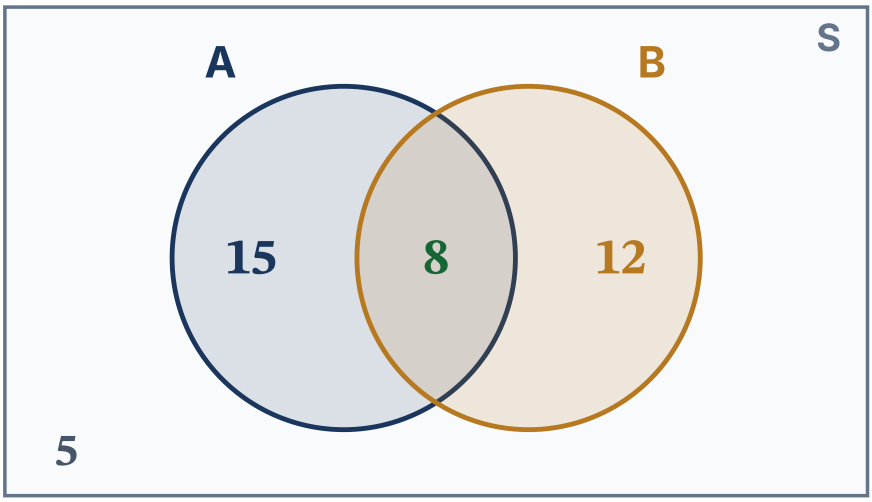
Name: ..... Class: .....

Date: .....

MARK ____ / 24

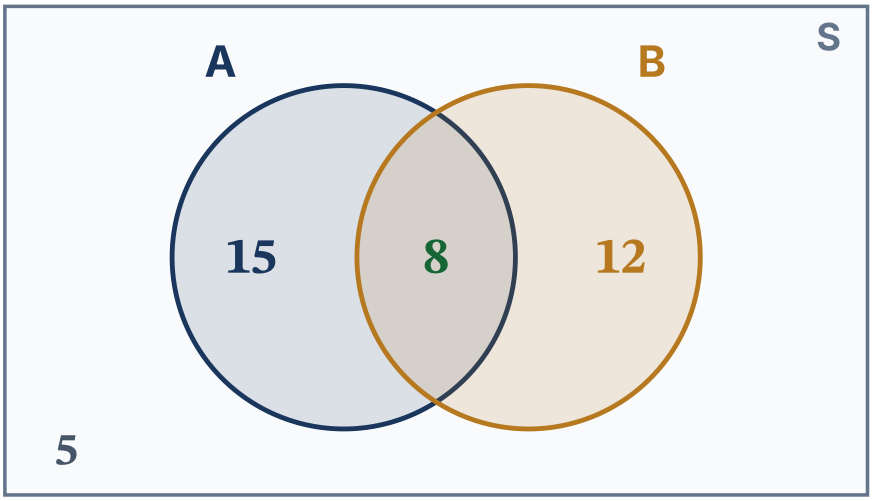
Answer all questions. Show all your working — marks are awarded for method as well as the final answer. **Teacher copy: accept any correct equivalent method.**

1 In the Venn diagram below, 40 learners were surveyed. Determine $n(A)$. (2)



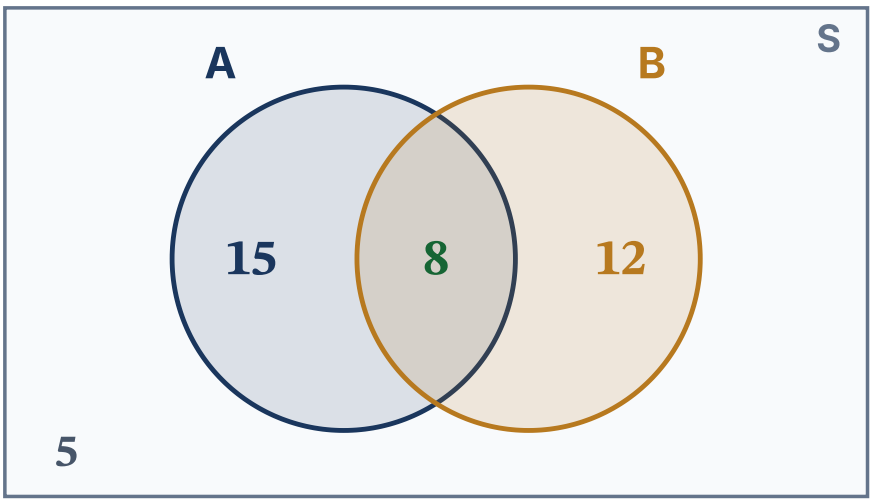
$15 + 8 = \mathbf{23}$ ✓✓ (2)

2 Using the Venn diagram below, calculate P(A and B). (2)



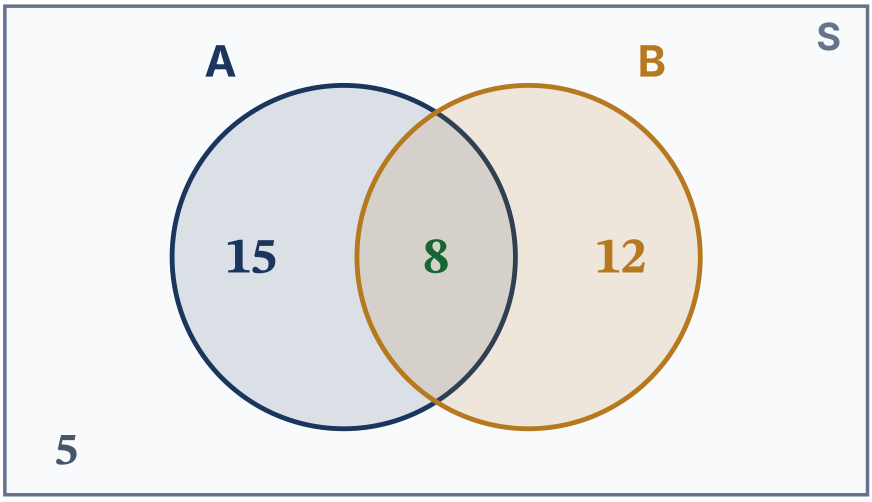
$\frac{8}{40} = \mathbf{0{,}20}$ ✓✓ (2)

3 Using the Venn diagram below, calculate P(A or B). (2)



$\frac{15+8+12}{40} = \frac{35}{40} = \mathbf{0,88}$ ✓✓ (2)

4 Using the Venn diagram below, calculate the probability that a learner takes neither A nor B. (2)



$\frac{5}{40} = \mathbf{0,13}$ ✓✓ (2)

5 P(A) = 0,4, P(B) = 0,5 and P(A and B) = 0,2. Are A and B independent? Show your working. (3)

P(A) × P(B) = 0,4 × 0,5 = 0,2 = P(A and B), so **yes, they are independent.** ✓✓✓ (3)

6 P(A) = 0,3, P(B) = 0,45 and A and B are mutually exclusive. Calculate P(A or B). (2)

$0,3 + 0,45 - 0 = \mathbf{0,75}$ ✓✓ (2)

7 If P(A) = 0,62, calculate P(not A). (1)

$1 - 0,62 = \mathbf{0,38}$ ✓ (1)

8 Explain the difference between mutually exclusive and complementary events. (2)

> **Mutually exclusive** events cannot happen together, so P(A and B) = 0. **Complementary** events are mutually exclusive AND cover the whole sample space, so P(A) + P(B) = 1. ✓✓ (2)

9 A coin is tossed 400 times and lands heads 214 times. Calculate the relative frequency of heads and comment on whether the coin appears fair. (2)

> $214 \div 400 = 0{,}535$ ✓; close to the theoretical $0{,}5$ over a large number of trials, so the coin appears fair ✓ (2)

10 In a class of 40: 22 play soccer, 18 play netball, 15 play tennis; 9 play soccer and netball, 7 play soccer and tennis, 6 play netball and tennis, and 4 play all three. How many play none of the three? (4)

> Centre 4 ✓; pairs only: 5, 3, 2 ✓; singles: soccer $22 - 5 - 3 - 4 = 10$, netball $18 - 5 - 2 - 4 = 7$, tennis $15 - 3 - 2 - 4 = 6$ ✓; total in at least one $= 10 + 7 + 6 + 5 + 3 + 2 + 4 = 37$, so none $= 40 - 37 = 3$ ✓ (4)

11 Explain why you must fill a three-event Venn diagram from the CENTRE outwards. (2)

> Each pairwise total already includes the learners who take all three ✓; filling from the centre lets you subtract that overlap so no one is counted twice ✓ (2)

TOTAL: 24 marks

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