FOUNDATION & HIGHER

SAME AT BOTH TIERS

Name ..... Class .....

P6: Sets and Venn diagrams

Reason with systematic listing, sets and Venn diagrams

20 marks · 25 minutes · Non-calculator

1) $\xi = \{1, 2, \ldots, 10\}$, A = even numbers, B = multiples of 3. Show that $A \cap B = \{6\}$

[Question 1: 2 marks]

2) Explain the difference between $A \cap B$ and $A \cup B$.

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[Question 2: 2 marks]

3) Kim says $n(A \cup B) = n(A) + n(B)$ always. Explain her mistake.

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[Question 3: 2 marks]

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4) 30 students: 18 play football, 15 play tennis and 8 play both. Show that 5 play neither.

[Question 4: 2 marks]

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5) Explain what A' means.

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[Question 5: 1 marks]

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6) Use a Venn diagram to explain why $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

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[Question 6: 2 marks]

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7) A coin is flipped and a dice is rolled. Show that there are 12 possible outcomes.

[Question 7: 2 marks]

8) Explain why listing outcomes systematically helps.

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[Question 8: 1 marks]

9) Spinner X has 1 to 3 and spinner Y has 1 to 4. Show that there are 12 possible pairs.

[Question 9: 2 marks]

10) Can $A \cap B$ be empty? Explain what this means.

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[Question 10: 2 marks]

11) Show that three coins have 8 possible outcomes.

[Question 11: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	Shown	$A = \{2,4,6,8,10\}$, $B = \{3,6,9\}$ (M1); C1.
2	Explanation	$\cap$: in both (C1); $\cup$: in either (C1).
3	Explanation	Elements in both are counted twice (C2).
4	Shown	$18 + 15 - 8 = 25$ (M1); $30 - 25$ (C1).
5	Explanation	Everything not in A (C1).
6	Explanation	The overlap is in both circles (C1); subtract it once (C1).
7	Shown	2×6 or list (M1); C1.
8	Explanation	None are missed or repeated (C1).
9	Shown	3×4 (M1); C1.
10	Yes	Mutually exclusive: no elements in common (C2).
11	Shown	$2 \times 2 \times 2$ or list (M1); C1.