FOUNDATION & HIGHER

SAME AT BOTH TIERS

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

P4: Probabilities that sum to 1

Solve problems using exhaustive and mutually exclusive events

20 marks · 25 minutes · Non-calculator

1) A spinner has $P(\text{red}) = 2x$, $P(\text{blue}) = x + 0.1$, $P(\text{green}) = 3x - 0.1$ and $P(\text{yellow}) = 0.4$. Find $P(\text{green})$ and the expected number of blues in 50 spins.

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[Question 1: 4 marks]

2) A bag has red, blue and green counters. $P(\text{red}) = 0.5$ and $P(\text{blue}) = 0.25$. There are 9 green counters. How many red counters are there?

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[Question 2: 3 marks]

3) The probability that a team wins is 0.55. A draw is twice as likely as a loss. Find the probability of a draw.

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[Question 3: 3 marks]

4) A and B are mutually exclusive. $P(A) = 0.35$ and $P(\text{not } B) = 0.6$. Find $P(A \text{ or } B)$.

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[Question 4: 2 marks]

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5) A dice is biased so that 4, 5 and 6 are each twice as likely as 1, 2 and 3. Find the probability of an even number.

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[Question 5: 3 marks]

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6) A bag of 40 counters has $P(\text{red}) = \frac{3}{8}$. How many blue counters must be added so that $P(\text{red}) = \frac{1}{4}$?

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[Question 6: 3 marks]

7) A spinner has $P(\text{red}) = 0.15$ and $P(\text{blue}) = 0.35$. Green and yellow are equally likely. How many yellows would you expect in 200 spins?

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[Question 7: 2 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	0.2; 10	$6x + 0.4 = 1$ (P1); $x = 0.1$ (P1); green 0.2 (A1); blue 0.2, so 10 (A1).
2	18	$P(\text{green}) = 0.25$ (P1); total 36 (P1); A1.
3	0.3	Loss x, draw $2x$, $3x = 0.45$ (P1, P1); A1.
4	0.75	$P(B) = 0.4$ (P1); A1.
5	$\frac{5}{9}$	$9x = 1$ (P1); even: $x + 2x + 2x$ (P1); A1.
6	20	15 red (P1); $\frac{15}{40 + k} = \frac{1}{4}$ (P1); A1.
7	50	Each 0.25 (P1); A1.