FOUNDATION & HIGHER

SAME AT BOTH TIERS

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

P3: Probability and relative frequency

Solve problems linking theoretical probability and relative frequency

20 marks · 25 minutes · Non-calculator

1) $P(\text{red}) = 0.25$ for a bag of counters. In 80 picks with replacement, red came up 26 times. Compare this with the expected number and comment.

[Question 1: 2 marks]

2) A bag has 20 counters and $P(\text{blue}) = 0.35$. 5 more blue counters are added. Find the new probability of blue.

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[Question 2: 3 marks]

3) A dice is rolled 300 times and lands on 6 a total of 75 times. Estimate $P(6)$. After 700 more rolls there have been 240 sixes in total. Give a better estimate of $P(6)$ and explain why it is better.

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[Question 3: 3 marks]

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4) A letter is chosen at random from ENGLAND. Find $P(\text{N})$ and $P(\text{vowel})$.

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[Question 4: 2 marks]

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5) A box has red and white balls. $P(\text{white}) = \frac{3}{8}$. There are 15 red balls. How many white balls are there?

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[Question 5: 3 marks]

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6) A and B are mutually exclusive with $P(A) = 0.3$ and $P(B) = 0.45$. In 600 trials, how many times would you expect neither to happen?

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[Question 6: 3 marks]

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7) A spinner has a red sector of 120°, a blue sector of 90° and a green sector of 150°. Find *P*(green) and the expected number of greens in 240 spins.

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[Question 7: 4 marks]

End of paper – 20 marks in total

Answers and brief mark scheme

Q	Answer	Method / notes
1	Expected 20	$0.25 \times 80 = 20$ (P1); 26 is higher; possible but more trials needed (C1).
2	0.48	7 blue (P1); $\frac{12}{25}$ (P1); A1.
3	0.25; 0.24	$\frac{75}{300}$ (A1); $\frac{240}{1000}$ (A1); more trials (C1).
4	$\frac{2}{7}$; $\frac{2}{7}$	B1 each.
5	9	Red is $\frac{5}{8}$ (P1); total 24 (P1); A1.
6	150	$P(\text{neither}) = 0.25$ (P1, P1); A1.
7	$\frac{5}{12}$; 100	$\frac{150}{360}$ (P1, A1); $\frac{5}{12} \times 240$ (P1, A1).