Expected versus observed outcomes

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

1. How many heads are expected in 20 tosses of a fair coin? [2 marks]

$20 \times \frac{1}{2} = 10.$

Answer: 10.

2. An event has probability $\frac{1}{5}$. How many successes are expected in 50 trials? [2 marks]

$50 \div 5 = 10.$

Answer: 10.

3. A fair coin gives 27 heads in 50 tosses. Find the observed percentage of heads. [2 marks]

$\frac{27}{50} = \frac{54}{100} = 54\%.$

Answer: 54%.

4. Using the supplied spinner results, how many fewer reds occurred than expected? [2 marks]

Supplied practice results: 40 spins of a fair four-colour spinner

Colour	Observed frequency
Red	8
Blue	9
Green	14
Yellow	9

Expected reds: $40 \div 4 = 10$.

Observed reds: 8; $10 - 8 = 2$.

Answer: 2 fewer.

5. A student changes the observed green frequency from 14 to 10 because the spinner should be fair. Explain the problem. [2 marks]

Recorded results must be retained unless a recording error is established.

Fairness does not guarantee an exact expected count.

Answer: The student has replaced evidence with a prediction.

6. A bag model gives a blue probability of 0.3. Predict blue counts in 100 trials, then explain whether 34 blue results proves the model wrong. [2 marks]

$100 \times 0.3 = 30$.

A difference of four can occur through random variation; further evidence would be needed.

Answer: 30 expected; 34 alone does not prove the model wrong.