Experimental versus theoretical results

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. An event occurs 18 times in 30 trials. Find relative frequency. [2 marks]

$18 \div 30 = 0.6$.

Answer: 0.6.

2. For $P(\text{win}) = \frac{1}{4}$, find expected wins in 240 trials. [2 marks]

$240 \times \frac{1}{4} = 60$.

Answer: 60.

3. A fair die gives 51 sixes in 240 rolls. State experimental and theoretical probabilities. [3 marks]

Actual counts define the estimate; the fair model defines theory.

Answer: $\frac{51}{240} = \frac{17}{80}$; theoretical $\frac{1}{6}$.

4. There are 23 successes in 80 trials, then 37 in 120 more. Find combined relative frequency. [3 marks]

$\frac{23+37}{80+120} = \frac{60}{200} = 0.3$.

Answer: 0.3.

5. Using an estimated probability 0.38, predict successes in 300 trials. [2 marks]

$300 \times 0.38 = 114$; it remains a prediction.

Answer: 114.

6. Why are exactly 10 heads not guaranteed in 20 fair tosses? [2 marks]

A long-run model proportion does not fix one batch’s outcome.

Answer: Many counts remain possible despite an expected count of 10.