Probability topic test

12 questions | 24 marks | 35 minutes

Find and compare probabilities, predict counts, read supplied results and explain variation.

Equivalent correct methods earn the corresponding marks.

1. Write the probability of an impossible event. [1 mark]

An impossible event has no favourable outcomes.

Answer: 0.

2. A bag has 2 red and 3 blue matching tokens. Find the probability of red. [1 mark]

There are 5 equally likely tokens and 2 are red.

Answer: 2/5.

3. Write 3/4 as a decimal and a percentage. [2 marks]

3/4 = 75/100.

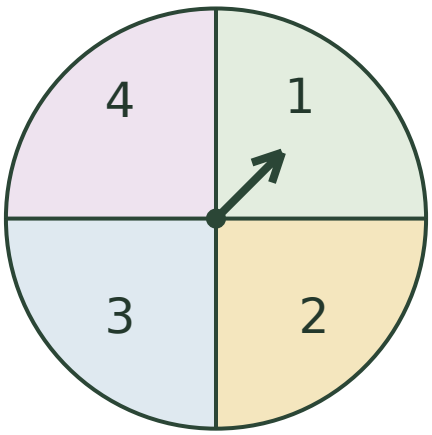
Answer: 0.75 and 75%.

4. Which is more likely: 0.6 or 55%? [1 mark]

0.6 = 60%, which exceeds 55%.

Answer: 0.6.

5. Using the equal-sector spinner, find the probability of an even number. [2 marks]



Even sectors are 2 and 4: $2/4 = 1/2$.

Answer: 1/2.

6. How many successes are expected in 80 trials when success has probability 1/4? [2 marks]

$80 \div 4 = 20$.

Answer: 20.

7. The four outcomes in the supplied table are equally likely. Find the expected count of A and compare it with the recorded count. [3 marks]

Supplied results for 100 fair-spinner trials

Outcome	Count
A	28
B	22
C	25
D	25

Each outcome has probability 1/4.

$100 \div 4 = 25$ and $28 - 25 = 3$.

Answer: 25 expected; 28 observed, 3 above expected.

8. Find the observed percentage of B in the table. [1 mark]

Supplied results for 100 fair-spinner trials

Outcome	Count
A	28
B	22
C	25
D	25

B occurred 22 times in 100 trials.

Answer: 22%.

9. A fair coin gives 32 heads in 60 tosses. Must two of these results be changed to make the experiment fair? Explain. [2 marks]

Thirty heads is an expected count, not a required observed count.

Changing genuine results would falsify the record.

Answer: No.

10. Experiment A gives 14 heads in 20 tosses. Experiment B gives 112 heads in 200 tosses. Which result is closer to 50%? [3 marks]

A: $14/20 = 70\%$.

B: $112/200 = 56\%$.

Distances from 50% are 20 and 6 percentage points.

Answer: Experiment B.

11. Does a 40% chance of success guarantee exactly four successes in the next ten trials? Explain. [2 marks]

Four is the expected count when the model stays unchanged.

An actual set of ten trials can have a different number of successes.

Answer: No.

12. Describe a simulation using equally likely random whole numbers 1 to 5 to model a bag with 2 red and 3 blue matching tokens. State the expected red count in 100 trials. [4 marks]

Two of five outcomes give red, matching 2/5.

Keep the same rule for every trial and record results.

$100 \times 2/5 = 40$.

Answer: Use 1 or 2 for red and 3, 4 or 5 for blue; repeat and record 100 trials. Expected red count 40.