Marking guide | Probability

Probability - Practice test 1

16 questions | 38 marks | 55 minutes

Build from sample spaces to replacement models, overlapping events and trial evidence.

Equivalent correct methods earn the corresponding marks.

1. A fair die is rolled. Find P(number greater than 4). [1 mark]

5 and 6 are favourable among six: $2/6 = 1/3$.

Answer: 1/3

2. List all ordered outcomes for two coin tosses. [1 mark]

List both second results for each first result.

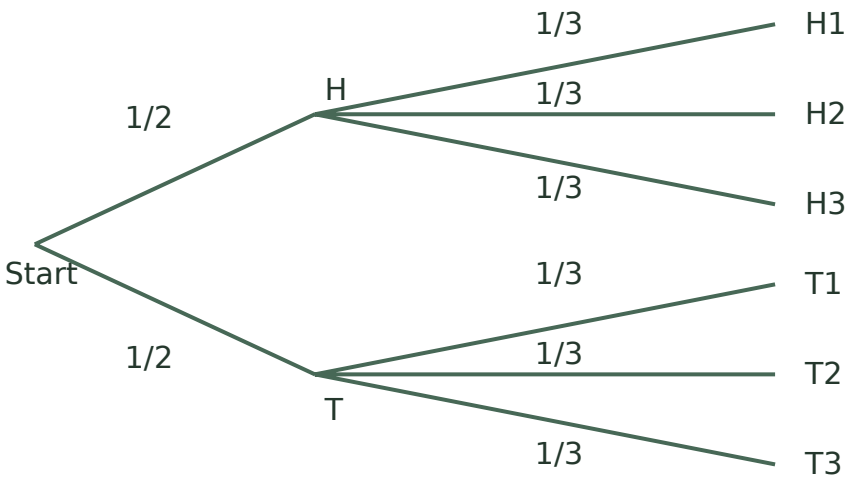
Answer: HH, HT, TH, TT.

3. Two fair independent coins are tossed. Find P(exactly one head). [2 marks]

HT and TH are two of four equally likely outcomes.

Answer: 1/2

4. A fair coin is followed by an independent equal spinner labelled 1, 2, 3. Find P(heads and 2). [2 marks]



Follow H then 2: $1/2 \times 1/3 = 1/6$.

Answer: 1/6

5. Two fair independent dice are rolled. Find P(sum 8). [3 marks]

Favourable ordered pairs: (2,6),(3,5),(4,4),(5,3),(6,2).

Five of 36 outcomes are favourable.

Answer: 5/36

6. An equal spinner labelled A, B, C is spun twice independently. Find P(different letters). [2 marks]

There are nine outcomes; AA, BB, CC are the three same-letter results.

Six are different, so $6/9 = 2/3$.

Answer: 2/3

7. A bag has 4 red and 1 blue counter. Draw twice at random, replacing and mixing after the first draw. Find P(two reds). [2 marks]

$4/5 \times 4/5 = 16/25$.

Answer: 16/25

8. A bag has 4 red and 1 blue counter. Draw twice at random without replacement. Find P(red then blue). [2 marks]

$4/5 \times 1/4 = 1/5$.

Answer: 1/5

9. A bag has 4 red and 1 blue counter. Draw twice at random without replacement. Find P(one counter of each colour). [3 marks]

RB has chance 1/5.

BR has chance $1/5 \times 4/4 = 1/5$.

Add the two disjoint orders.

Answer: 2/5

10. Of 24 students, 14 attend art, 10 attend music and 4 attend both. [4 marks]

(a) How many attend at least one of the two activities? [2 marks]

$14 + 10 - 4 = 20$.

Answer: 20

(b) Find the probability that a randomly chosen student attends neither. [2 marks]

$24 - 20 = 4$ attend neither; $4/24 = 1/6$.

Answer: 1/6

11. A fair die is rolled. Find P(even or prime). [3 marks]

Even: {2,4,6}; prime: {2,3,5}.

The union is {2,3,4,5,6}; count 2 only once.

Answer: 5/6

12. An event occurs 36 times in 120 trials. [3 marks]

(a) Find its relative frequency. [1 mark]

$36/120 = 0.30$.

Answer: 0.30

(b) Use this estimate to predict its count in 180 similar trials. [2 marks]

$180 \times 0.30 = 54$.

Answer: About 54.

13. Give a fair random-digit mapping, using digits 0-9, to simulate a fair coin. [2 marks]

Each outcome receives five of the ten equally likely digits.

Answer: For example, 0-4 = heads and 5-9 = tails.

14. Use 0-4 = H and 5-9 = T. Read pairs 03, 57, 28, 64, 91. Find the relative frequency of exactly one head. [3 marks]

The outcomes are HH, TT, HT, TH, TH.

Three of five have exactly one head.

Answer: 3/5

15. An event has probability 1/4. Explain whether 80 independent trials must contain exactly 20 successes. [2 marks]

$80 \times 1/4 = 20$ is an average prediction.

Random variation can give other counts.

Answer: No. Twenty is the expected count, not a guaranteed count.

16. A fair independent coin gives four tails. A student says heads is now more likely. Assess the claim. [3 marks]

Past results do not alter the next independent toss.

There is no balancing rule requiring a head next.

Answer: The claim is false; the next-head probability is still 1/2.