Marking guide | Probability

Probability - Practice test 2

16 questions | 45 marks | 60 minutes

Compare models, tables and dependent events.

Equivalent correct methods earn the corresponding marks.

1. A spinner has P(A)=1/2, P(B)=1/3 and P(C)=1/6. Find P(not C). [2 marks]

1−1/6=5/6.

Answer: 5/6.

2. A spinner has P(A)=1/2, P(B)=1/3 and P(C)=1/6. It is spun twice independently. Find P(the same letter twice). [3 marks]

P(AA)+P(BB)+P(CC)=1/4+1/9+1/36.

(9+4+1)/36=14/36=7/18.

Answer: 7/18.

3. A cafe offers 2 vegetarian mains and 3 other mains, each with 3 drinks. How many vegetarian-main-and-drink choices are there? [2 marks]

Restrict the mains first, then 2×3=6.

Answer: 6.

4. Using digits 1,2,3,4 once each, how many four-digit numbers are even? [3 marks]

Choose the last digit in 2 ways.

Arrange the other three in 3!=6 ways;2×6=12.

Answer: 12.

5. How many distinct arrangements of AABC are there? Explain the overcount. [3 marks]

Four labelled letters would give 4!=24.

The two identical A letters cause a factor 2 overcount;24/2=12.

Answer: 12.

6. Seven students form an unordered pair. How many pairs? [3 marks]

7×6=42 ordered selections.

Each pair appears twice, so 42/2=21.

Answer: 21.

7. A number is chosen uniformly from 1-10. Given that it is even, find the probability it is greater than 5. [2 marks]

Restrict to{2,4,6,8,10};6,8,10 satisfy the event.

Answer: 3/5.

8. Using the club table, find P(not music|drama). [2 marks]

Invented membership data for 60 students.

Music membership	Drama	Not drama	Total
Music	8	12	20
Not music	10	30	40
Total	18	42	60

10 of 18 drama students do not do music;10/18=5/9.

Answer: 5/9.

9. A group has 30 girls and 20 boys. Nine girls and six boys wear glasses. [4 marks]

(a) Find P(girl|glasses). [2 marks]

9/(9+6)=9/15=3/5.

Answer: 3/5.

(b) Are girl and glasses independent in this data? [2 marks]

P(girl)=30/50=3/5, equal to the conditional probability.

Answer: Yes.

10. A bag has 4 green and 3 yellow counters. Draw two without replacement. Find P(one of each colour). [3 marks]

GY=(4/7)(3/6)=2/7.

YG=(3/7)(4/6)=2/7;total 4/7.

Answer: 4/7.

11. A bag contains 4 green and 3 yellow counters. Draw twice at random without replacement. Find P(second green|first yellow). [2 marks]

Removing yellow leaves 4 green among 6 counters;4/6=2/3.

Answer: 2/3.

12. P(A)=0.6, P(B)=0.4, P(A|B)=0.75. [4 marks]

(a) Find P(A and B). [2 marks]

0.75×0.4=0.3.

Answer: 0.3.

(b) Find P(A or B). [2 marks]

0.6+0.4−0.3=0.7.

Answer: 0.7.

13. A tree has first-stage P(A)=0.7 and P(not A)=0.3. Given A, P(B)=0.2; given not A, P(B)=0.6. Find P(B). [3 marks]

Add disjoint paths:(0.7)(0.2)+(0.3)(0.6)=0.14+0.18.

Answer: 0.32.

14. A simulation records 95 events in 400 trials. Estimate the probability. [2 marks]

95/400=0.2375.

Answer: 0.2375.

15. A fair coin has landed head five times. Under the independent-toss model, find the next-tail probability and explain. [3 marks]

Earlier results do not change the next independent toss.

Answer: 1/2.

16. In an invented scanner trial,20 unreadable labels are flagged and 5 are not. Of 975 readable labels,80 are flagged. [4 marks]

(a) Find P(unreadable|flagged). [2 marks]

Flagged total 20+80=100;20/100=1/5.

Answer: 1/5.

(b) Find P(flagged|unreadable). [2 marks]

Unreadable total 25;20/25=4/5.

Answer: 4/5.