



Attempt questions first; check the separate key afterward. Show steps and draw labelled diagrams where asked.

A. Very short answers - 1 mark each

1. Define probability for equally likely outcomes.
2. Find probability of a head on a fair coin.
3. Find probability of 6 on a fair die.
4. State probability of an impossible event.
5. State probability of a certain event.
6. Can probability be negative?
7. If $P(A)=0.3$, find $P(\text{not } A)$.
8. Find probability of an even number on a fair die.

B. Short answers / practice - 2 marks each

9. Find probability of a prime on a fair die.
10. A bag has 3 red, 5 blue balls. Find $P(\text{red})$.
11. Find $P(\text{king})$ from a 52-card deck.
12. Find $P(\text{red queen})$ from a 52-card deck.
13. Two fair coins are tossed. Find $P(\text{exactly one head})$.
14. Find $P(\text{at least one head})$ in two fair tosses.
15. Two fair dice are rolled. Find $P(\text{sum } 7)$.
16. Find $P(\text{sum } 2)$ with two fair dice.
17. A number is chosen uniformly from 1 to 20. Find $P(\text{multiple of } 3)$.
18. Find $P(\text{neither ace nor king})$ in a 52-card deck.
19. A bag contains 4 white, 6 black balls. Find $P(\text{not black})$.
20. Explain why the 31 possible sums 2 to 32 would not be equally likely for two 16-sided dice.

C. Application / reasoning - 3 marks each

21. Two dice are rolled. Find $P(\text{sum greater than } 10)$.
22. Find $P(\text{a double})$ on two fair dice.

23. Choose a number uniformly from 1 to 30. Find $P(\text{divisible by } 2 \text{ or } 3)$.

24. Three fair coins are tossed. Find $P(\text{exactly two heads})$.

25. A bag has 5 red and x blue balls; $P(\text{red})=1/3$. Find x .

26. Can an event and its complement have equal probabilities?

27. A fair die is rolled. Find probability of an outcome greater than 4.

28. Two fair coins are tossed. Find probability of exactly one head.

29. A bag has 4 red and 6 blue balls. Find probability of a blue ball.

30. Choose an integer uniformly from 1 to 30. Find probability it is divisible by 5.

31. A fair die is rolled twice. Find probability the two outcomes are equal.

D. Extended practice - 5 marks each

32. List all outcomes for two fair dice with sum 9 and hence find its probability.

33. A card is selected from cards numbered 1-50. Find $P(\text{perfect square})$ and $P(\text{multiple of } 7)$.

34. Two fair dice are rolled. Find $P(\text{product even})$ using a complement.

35. A bag has 2 red, 3 green, 5 blue balls. Find probabilities of each colour and verify their sum.

ANSWER KEY - Numerical / closed questions

2) $1/2$. 3) $1/6$. 4) 0. 5) 1. 6) No. 7) 0.7. 8) $1/2$. 9) $1/2$. 10) $3/8$. 11) $1/13$. 12) $1/26$. 13) $1/2$. 14) $3/4$. 15) $1/6$. 16) $1/36$. 17) $3/10$. 18) $11/13$. 19) $2/5$. 21) $1/12$. 22) $1/6$. 23) $2/3$. 24) $3/8$. 25) 10. 26) Yes; both $1/2$. 27) $1/3$. 28) $1/2$. 29) $3/5$. 30) $1/5$. 31) $1/6$. 32) (3, 6), (4, 5), (5, 4), (6, 3); $1/9$. 33) $7/50$; $7/50$. 34) $3/4$. 35) $1/5$, $3/10$, $1/2$; sum 1.