

# Probability

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$$\begin{array}{l} 2, 4, 6 \\ 1, 2, 3, 4, 5, 6 \end{array} = \frac{3}{6} = \frac{1}{2}$$

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11+ Maths | Probability Worksheet

## Probability Worksheet

11+ Preparation · 30 Questions · Increasing Difficulty

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Score: \_\_\_\_ / 30

**Instructions:** Answer all 30 questions. Show your working in the space provided or on a separate sheet. Probabilities should be given as a fraction in its simplest form unless stated otherwise. Calculators are not permitted.

### Section A · Foundation (Questions 1–10)

1. A fair coin is flipped once. What is the probability of getting heads?
2. A standard six-sided dice is rolled. What is the probability of rolling a 4?
3. A bag contains 3 red sweets and 5 blue sweets. One sweet is taken at random. What is the probability that it is red?
4. The probability that it will rain tomorrow is 0.3. What is the probability that it will **not** rain tomorrow?
5. A spinner has 8 equal sections numbered 1 to 8. What is the probability of spinning an even number?
6. There are 12 pencils in a pencil case: 4 red, 3 blue, and 5 green. One pencil is picked at random. What is the probability it is blue?
7. A letter is chosen at random from the word **PROBABILITY**. What is the probability that the letter is I?
8. A standard pack of 52 playing cards is shuffled. What is the probability that the top card is a heart?
9. A box contains 20 chocolates. 8 are milk, 7 are dark, and the rest are white. One chocolate is taken at random. What is the probability that it is white?
10. A fair six-sided dice is rolled. What is the probability of rolling a number greater than 4?

### Section B · Intermediate (Questions 11–20)

11. A bag contains red, blue and yellow counters. The probability of picking a red counter is  $\frac{1}{4}$ , and the probability of picking a blue counter is  $\frac{1}{3}$ . What is the probability of picking a yellow counter?
12. A spinner is split into 5 equal sections coloured red, red, blue, green, and yellow. The spinner is spun once. What is the probability of **not** landing on red?
13. Two fair coins are flipped at the same time. What is the probability that both coins show heads?
14. There are 30 children in a class. 18 are girls. A child is chosen at random. What is the probability that the child is a boy? Give your answer as a fraction in its simplest form.

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15. A dice is rolled 60 times. How many times would you expect to roll a 3?
16. The probability that a biased coin lands on heads is 0.7. The coin is flipped 200 times. How many heads would you expect?
17. A bag contains 4 red balls and 6 green balls. A ball is taken at random and **replaced**. Then a second ball is taken. What is the probability that both balls are red?
18. A letter is chosen at random from the word **MATHEMATICS**. What is the probability that the letter is a vowel?
19. A fair six-sided dice is rolled and a fair coin is flipped. What is the probability of rolling a 6 **and** getting tails?
20. There are 7 boys and 5 girls in a club. Two children are chosen at random (without replacement) to be team leaders. What is the probability that the first child chosen is a girl and the second is a boy?

**Section C · Advanced (Questions 21–30)**

21. A bag contains 5 red, 4 blue, and 3 green counters. Two counters are drawn at random **without replacement**. What is the probability that both counters are red?
22. Two fair six-sided dice are rolled and the scores are added together. What is the probability that the total is 7?
23. Two fair six-sided dice are rolled. What is the probability that the total of the two scores is greater than 9?
24. A bag contains only red and blue counters. The probability of picking a red counter is  $\frac{1}{3}$ . There are 12 red counters. How many blue counters are in the bag?
25. Three fair coins are flipped. What is the probability of getting **at least one** tail? (Hint: think about the opposite event.)
26. A box contains 10 chocolates: 6 milk and 4 dark. Two chocolates are chosen at random without replacement. What is the probability that one is milk and the other is dark? (Either order counts.)
27. In a class of 25 students, 14 study French, 10 study German, and 4 study both. A student is chosen at random. What is the probability that the student studies **neither** French nor German?
28. A spinner has 10 equal sections numbered 1 to 10. The spinner is spun once. What is the probability that the number is a prime number **or** a multiple of 4?
29. A bag contains 8 red and 4 yellow sweets. Sara takes 2 sweets at random without replacement. What is the probability that **both** sweets are the **same** colour?
30. In a school of 200 pupils, 120 own a bike and 90 own a scooter. 50 pupils own both. A pupil is chosen at random. What is the probability that the pupil owns a bike but **not** a scooter?

Handwritten notes for questions 21-30:

21.  $\frac{5}{12} \times \frac{4}{11}$

22.  $1 \times 6$  or  $2 \times 5$  or  $3 \times 4$  or  $4 \times 3$  or  $5 \times 2$  or  $6 \times 1$

23.  $\frac{1}{36} + \frac{1}{36} + \frac{1}{36} + \frac{1}{36} + \frac{1}{36} + \frac{1}{36}$

24.  $\frac{1}{3}$

25.  $1 - \frac{1}{8} = \frac{7}{8}$

26.  $\frac{6}{10} \times \frac{4}{9} + \frac{4}{10} \times \frac{6}{9}$

27.  $\frac{11}{25}$

28.  $\frac{7}{10}$

29.  $\frac{8}{12} \times \frac{7}{11} + \frac{4}{12} \times \frac{3}{11}$

30.  $\frac{120}{200} - \frac{50}{200} = \frac{70}{200} = \frac{7}{20}$

— End of Worksheet —

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Handwritten probability tree for three coins:

HHH

HTH

TTH

HHT

TTH

THT

HTT

TTT

Probability of at least one tail:  $1 - \frac{1}{8} = \frac{7}{8}$

Probability of all heads:  $\frac{1}{8}$

