

Foundation GCSE: Calculating Probabilities

Name: _____

Class: _____

Instructions: Answer all questions. Questions are ordered from easiest (1) to hardest (20). Working out should be shown where appropriate.

1. A bag contains 4 red and 6 blue marbles. Find $P(\text{red})$ as a fraction in simplest form.
2. The probability that it rains tomorrow is 0.3. Find the probability that it does not rain.
3. A fair spinner has numbers 1 to 10. Find $P(\text{multiple of 3})$.
4. The probability of winning a prize in a raffle is $\frac{2}{15}$. Find $P(\text{not winning})$.
5. A box contains 5 green, 3 yellow, and 2 red sweets. Find $P(\text{yellow})$.
6. A letter is chosen at random from the word PROBABILITY. Find $P(\text{letter is 'B'})$.
7. A tile is selected from 15 tiles numbered 1 to 15. Find $P(\text{prime number})$.
8. In a class of 30 students, 18 walk to school. Find $P(\text{a student selected at random walks to school})$.
9. The probability of passing a driving test is 0.62. What is the probability of failing?
10. A jar contains 20 beads. The probability of picking a blue bead is $\frac{3}{5}$. How many blue beads are in the jar?
11. A box contains red, blue, and green pens. $P(\text{red}) = 0.4$, $P(\text{blue}) = 0.35$. Find $P(\text{green})$.
12. A standard pack of 52 cards is shuffled. Find $P(\text{picture card – King, Queen, or Jack})$.
13. A biased die has $P(1) = 0.1$, $P(2) = 0.2$, $P(3) = 0.15$, $P(4) = 0.25$, $P(5) = 0.1$. Find $P(6)$.
14. A bag contains k red and 12 blue counters. The probability of picking red is $\frac{1}{4}$. Find k .
15. A spinner has 8 sections numbered 1 to 8. Find $P(\text{factor of 12})$.
16. The probability of picking a red counter from a bag is $\frac{5}{12}$. There are 15 red counters. Find total counters.
17. A fair six-sided die is rolled. Find $P(\text{square number})$.
18. A raffle sells 500 tickets. Amy buys 25 tickets. What is $P(\text{Amy wins})$ as a simplified fraction?
19. In a tin, the ratio of choc-chip to oat biscuits is 3 : 5. Find $P(\text{choc-chip})$.
20. A bag contains red, blue, and yellow counters in ratio 2 : 3 : 5. Find $P(\text{not yellow})$.

Answers & Worked Solutions

1. $\frac{2}{5} - \frac{4}{10} = \frac{2}{5}$.
2. $0.7 - 1 - 0.3 = 0.7$.
3. $\frac{3}{10}$ – Multiples are 3, 6, 9. Probability = $\frac{3}{10}$.
4. $\frac{13}{15} - 1 - \frac{2}{15} = \frac{13}{15}$.
5. $\frac{3}{10}$ – Total sweets = 10. $\frac{3}{10}$.
6. $\frac{2}{11}$ – Total letters = 11, 'B' appears 2 times.
7. $\frac{2}{5}$ – Primes: 2, 3, 5, 7, 11, 13 (6 primes). $\frac{6}{15} = \frac{2}{5}$.
8. $\frac{3}{5} - \frac{18}{30} = \frac{3}{5}$.
9. $0.38 - 1 - 0.62 = 0.38$.
10. $12 - \frac{3}{5} \times 20 = 12$.
11. $0.25 - 1 - (0.4 + 0.35) = 1 - 0.75 = 0.25$.
12. $\frac{3}{13}$ – 12 picture cards. $\frac{12}{52} = \frac{3}{13}$.
13. $0.2 - 1 - (0.1 + 0.2 + 0.15 + 0.25 + 0.1) = 1 - 0.8 = 0.2$.
14. $4 - \frac{k}{k+12} = \frac{1}{4} \implies 4k = k + 12 \implies 3k = 12 \implies k = 4$.
15. $\frac{5}{8}$ – Factors of 12 on spinner: 1, 2, 3, 4, 6 (5 outcomes). $\frac{5}{8}$.
16. $36 - \frac{5}{12} = \frac{15}{N} \implies N = \frac{15 \times 12}{5} = 36$.
17. $\frac{1}{3}$ – Square numbers: 1, 4 (2 outcomes). $\frac{2}{6} = \frac{1}{3}$.
18. $\frac{1}{20} - \frac{25}{500} = \frac{1}{20}$.
19. $\frac{3}{8}$ – Choc-chip parts = 3, total parts = 3 + 5 = 8.
20. $\frac{1}{2}$ – Total parts = 10. Not yellow = 2 + 3 = 5. $\frac{5}{10} = \frac{1}{2}$.