# Probability Basics

KS3 Maths · Follows the national curriculum

Name _____ Class _____ Date _____

## 1. Worked example

**A bag has 3 green, 5 yellow, 2 purple counters. Find P(yellow).**

Step 1 · Find total counters

3+5+2 = 10 total

Step 2 · Apply the probability formula

P(yellow) = 5 ÷ 10

Step 3 · Simplify

= 1/2

**Answer: P(yellow) = 1/2**

Check: 5 out of 10 simplifies to 1/2 ✓

## 2. Now try one with the steps

**P(a train is late) = 0.12. Find P(the train is not late).**

Step 1 · An event either happens or it does not

Step 2 · Subtract from 1

**Answer:**

## 3. Practice

Show your working. The marks tell you how much is expected.

1. A standard die is rolled. Find the probability of rolling a 5. [1]

2. A bag contains 4 red balls and 6 blue balls. Find the probability of picking a red ball. [2]

3. The probability that it rains tomorrow is 0.3. Find the probability that it does NOT rain. [2]

4. A spinner has 8 equal sections numbered 1–8. Find the probability of landing on an even number. [2]

**5.** A bag has 20 balls: some red, some blue. The probability of picking red is 0.35. How many red balls are there? [3]

**6.** Explain the difference between theoretical probability and experimental (relative frequency) probability. [3]

**7.** What is the probability of an event that is certain to happen? [1]

**8.** A fair dice is rolled. Find the probability of rolling a number greater than 4. [1]

**9.** A letter is picked at random from the word MATHEMATICS. Find the probability that it is an M. [1]

**10.** A letter is picked at random from the word ENGLAND. Find the probability that it is a vowel. [1]

**11.** A fair dice is rolled. Find the probability of NOT rolling a multiple of 3. [2]

**12.** A spinner can land on red, blue or green. P(red) = 0.25 and P(blue) = 0.4. Find P(green). [2]

**13.** A bag has red, blue and yellow counters in the ratio 2:3:5. A counter is picked at random. Find P(blue). [2]

**14.** Events A and B are mutually exclusive. P(A) = 0.15 and P(B) = 0.3. Find P(A or B). [1]

**15.** A bag has 5 red counters and some blue counters. The probability of picking red is 1/4. How many blue counters are there? [3]

**16.** A whole number from 1 to 30 is chosen at random. Find the probability that it is prime. [2]

## 4. Before you hand it in

**Writing a probability greater than 1, or negative number**

Probability values are ALWAYS between 0 (impossible) and 1 (certain), inclusive. If your calculation gives something outside this range, you've made an error — check your fraction or division.

**Adding probabilities of events that aren't mutually exclusive without adjusting**

P(A or B) = P(A) + P(B) only works if A and B CANNOT both happen at once (mutually exclusive). If they can overlap, you must subtract the overlap: P(A or B) = P(A) + P(B) − P(A and B).

**Thinking a 6 is harder to roll than a 3 on a fair dice**

On a fair dice every face is equally likely, so P(6) = P(3) = 1/6. Feeling that 6s are rare is a memory trick: we notice when we need one and do not get it.