

Probability

Year 9 / S3

Use the example below to help you solve the following problems.

Independent Events

- The outcome of one event does not affect the outcome of the other.
- $P(A \& B) = P(A) \times P(B)$

Chances of picking a red marble followed by a green marble with replacement.

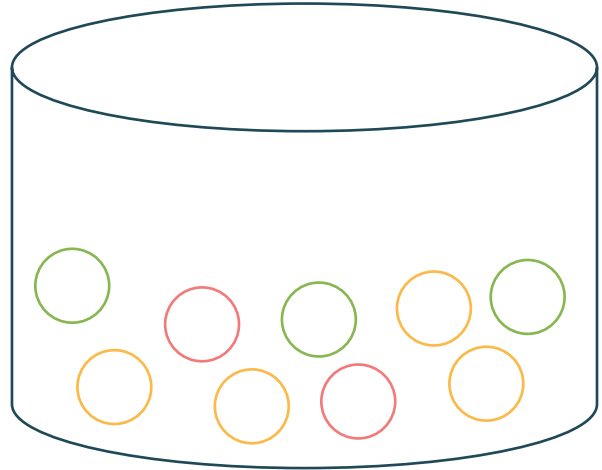
$$= \frac{2}{9} \times \frac{3}{9} = \frac{6}{81} = \frac{2}{27}$$

Dependent Events

- The outcome of one event does affect the outcome of the other.
- $P(A \& B) = P(A) \times P(B | A)$

Chances of picking a red marble followed by a green marble without replacement.

$$= \frac{2}{9} \times \frac{3}{8} = \frac{6}{72} = \frac{1}{12}$$



Activity 1

Calculate the following probabilities **with** replacement. Give your answer in the simplest form.

- 1 Picking a green marble followed by a yellow marble.
- 2 Picking a red marble followed by another red marble.
- 3 Picking a yellow marble, then a green marble, then a red marble.

Calculate the following probabilities **without** replacement. Give your answer in the simplest form.

- 4 Picking a green marble followed by a yellow marble.
- 5 Picking a red marble followed by another red marble.
- 6 Picking a yellow marble, then a green marble, then a red marble.

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Activity 2

Calculate the probabilities of the statements below, given the information you have been given. Remember to consider how the dependent events affect each other. You may use a calculator for questions 3 and 4.

There's a $\frac{1}{6}$ chance that I'll wake up before 7:00am. If I do, I'll turn my alarm off before it goes off.

The probability of the bus arriving after 8:45am is $\frac{7}{10}$.

I'll take the bus if it arrives before 8:45am, otherwise I'll get a lift in the car.

If I take the bus, there's a $\frac{1}{9}$ that I'll fall asleep on it.

Normally, my breakfast could be:
Cereal = $\frac{1}{2}$ chance
Fruit = $\frac{1}{3}$ chance
Yoghurt = $\frac{1}{6}$ chance

The chance of my phone being on and my alarm going off at 7:00am is $\frac{9}{10}$.

If I had fruit for breakfast, the chances of me winning at badminton are $\frac{2}{3}$. Otherwise, it reduces to $\frac{1}{4}$.

If my alarm doesn't go off and I wake up late, I'll have to have fruit for breakfast to save time.

- 1 The probability of me being woken up by my alarm at 7:00am.
- 2 The probability of me taking the bus and falling asleep on it.
- 3 The probability of me having fruit for breakfast.
- 4 The probability of me having yoghurt for breakfast and winning at badminton.

Activity 3

Challenge: Create your own statement and calculate the probability.