

OCR 11 Probability (Foundation)

- The probability that Mark is late for school is 0.35.
What is the probability that he is not late for school?
- What is the probability of randomly selecting a king from a normal pack of cards? Give your answer as a fraction in its simplest form.
- Maria rolls a fair, normal six-sided dice once.
Write down the probability that she gets a number less than 3.
- Raffle tickets numbered from 1 to 50 are sold at a church fete. Find the probability that a ticket with a multiple of 10 is chosen. Give your answer as a fraction in its simplest form.
- A bag of sweets contains only 15 red sweets, 10 yellow sweets and 5 green sweets.
What is the probability of randomly selecting a sweet that is not yellow?
- A letter is chosen at random from the word MATHEMATICS.
What is the probability that it is an M?
- The probability that a biased spinner will land on its green section is 0.15. Harry is going to spin it 300 times. Work out an estimate for the number of times the spinner will land on its green section.
- A bus can arrive early, on time or late. The probability that the bus is on time is 0.61 and the probability that it is early is 0.03. What is the probability that the bus is late?
- Ajay spins two spinners together. Spinner 1 has 3 sides labelled 1, 2 and 3. Spinner 2 has 3 sides labelled A, B and C. What is the probability that Ajay spins a 2 and a C?
- A fair, four-sided spinner can land on 1, 2, 3 or 4. The spinner is spun twice and the two scores added together to give a total. Fill in the table below to show all the possible totals.

		Spin 2			
		1	2	3	4
Spin 1	1				
	2				
	3				
	4				

- Using the table in question 10, find the probability that the total is at least 5.
- The three possible outcomes for a team playing football are win, lose or draw.
Does this mean that their probability of winning is $\frac{1}{3}$? Explain your answer.
- A tin contains only 5 chocolate biscuits and 3 ginger biscuits. John chooses a biscuit at random from the tin, eats it and then chooses a second biscuit from the tin. Draw a tree diagram to show this information.

14. Using your tree diagram in question 13, find the probability that John chooses at least one ginger biscuit.
15. Mary rolls a dice 180 times and gets a six 65 times.
Do you think her dice is biased? Explain your answer.
16. Gemma and Abbie go to the cinema. The probability that Gemma enjoys the film is 0.7.
The probability that Abbie enjoys the film is $\frac{3}{5}$. These events are independent.
What is the probability that they both enjoy the film?
17. A dessert consists of ice cream, sauce and a topping.
Here are the different options.
- **Ice cream:** Strawberry or vanilla
 - **Sauce:** Chocolate or strawberry
 - **Topping:** Marshmallows, chopped nuts or chocolate sprinkles
- What proportion of total dessert combinations do not involve chocolate?
18. Barry has a bag of sweets. The bag contains only 4 red, 5 green and 7 yellow sweets. Barry chooses a sweet at random and eats it. He then chooses a second sweet. Find the probability that both sweets were red.
19. A fair 5-sided spinner has sides numbered 1 to 5. Ruth spins the spinner three times and wins a prize if the spinner lands on a 4 or a 5 all three times. Find the probability of Ruth winning a prize.
20. A board has three coloured sections, red, yellow and blue. Jim throws a dart at the board. The probability his dart misses the board is 0.64. The probabilities of his dart hitting each coloured section are equal. What is the probability his dart hits the yellow section of the board?

Answers

1. 0.65

2. $\frac{1}{13}$

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

4. $\frac{1}{10}$

5. $\frac{20}{30}$ or $\frac{2}{3}$

6. $\frac{2}{11}$

7. $300 \times 0.15 = 45$

8. 0.32

9. $\frac{1}{3} \times \frac{1}{3} = \frac{1}{9}$

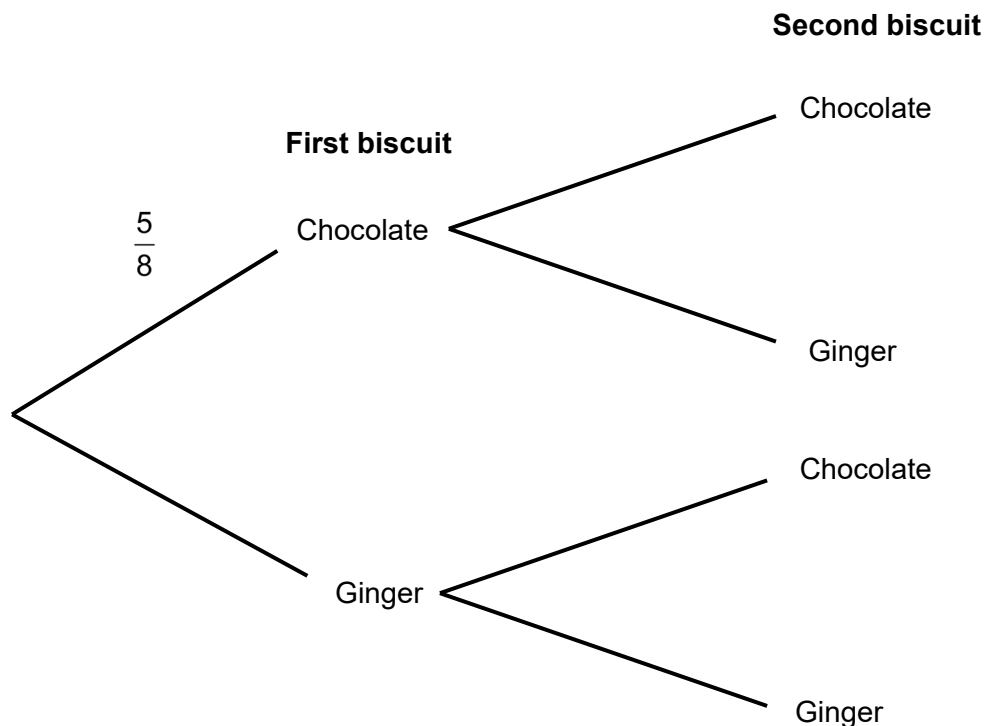
10.

		Spin 2			
		1	2	3	4
Spin 1	1	2	3	4	5
	2	3	4	5	6
	3	4	5	6	7
	4	5	6	7	8

11. $\frac{1}{8}$

12. Whilst we know that there are three outcomes we do not know the probability of achieving each outcome. There will be many factors affecting the probability of winning so the probability is not simply $\frac{1}{3}$.

13.



14. Three ways of choosing a ginger biscuit: (ginger first and chocolate second) OR (chocolate first and ginger second) OR (2 ginger biscuits)

$$= \frac{3}{8} \times \frac{5}{7} + \frac{5}{8} \times \frac{3}{7} + \frac{3}{8} \times \frac{2}{7} = \frac{36}{56} = \frac{9}{14}$$

15. If the dice was not biased she would expect to get a six 30 times ($180 \times \frac{1}{6} = 30$). In her experiment she gets a six almost double the expected number of times, so her dice is likely to be biased.

16. $\frac{3}{5} = 0.6$
 $0.7 \times 0.6 = 0.42$

17. There are 12 possible combinations, shown below.

There are 4 combinations that do not involve chocolate (shaded in table below).

The proportion of total dessert combinations that do not involve chocolate is $\frac{4}{12} = \frac{1}{3}$.

Ice cream	Sauce	Topping
Strawberry	Chocolate	Marshmallows
Strawberry	Chocolate	Chopped nuts
Strawberry	Chocolate	Chocolate sprinkles
Strawberry	Strawberry	Marshmallows
Strawberry	Strawberry	Chopped nuts
Strawberry	Strawberry	Chocolate sprinkles
Vanilla	Chocolate	Marshmallows
Vanilla	Chocolate	Chopped nuts
Vanilla	Chocolate	Chocolate sprinkles
Vanilla	Strawberry	Marshmallows
Vanilla	Strawberry	Chopped nuts
Vanilla	Strawberry	Chocolate sprinkles

18. $\frac{4}{16} \times \frac{3}{15} = \frac{12}{240} = \frac{1}{20}$

19. Probability of spinner landing on a 4 or a 5 = $\frac{2}{5} = 0.4$.

Probability of Ruth winning a prize = $0.4 \times 0.4 \times 0.4 = 0.064$.

20. $\frac{1 - 0.64}{3} = 0.12$

We'd like to know your view on the resources we produce. By clicking on '[Like](#)' or '[Dislike](#)' you can help us to ensure that our resources work for you. When the email template pops up please add additional comments if you wish and then just click 'Send'. Thank you.

Whether you already offer OCR qualifications, are new to OCR, or are considering switching from your current provider/awarding organisation, you can request more information by completing the Expression of Interest form which can be found here:

www.ocr.org.uk/expression-of-interest

Looking for a resource? There is now a quick and easy search tool to help find free resources for your qualification:

www.ocr.org.uk/i-want-to/find-resources/

OCR Resources: the small print

OCR's resources are provided to support the delivery of OCR qualifications, but in no way constitute an endorsed teaching method that is required by the Board, and the decision to use them lies with the individual teacher. Whilst every effort is made to ensure the accuracy of the content, OCR cannot be held responsible for any errors or omissions within these resources. This formative assessment resource has been produced as part of our free GCSE teaching and learning support package. All the GCSE teaching and learning resources, including delivery guides, topic exploration packs, lesson elements and more are available on the qualification webpages. If you are looking for examination practice materials, you can find Sample Assessment Materials (SAMs) and Practice Papers on the qualification webpage <http://www.ocr.org.uk/qualifications/gcse-mathematics-j560-from-2015/>

© OCR 2017 - This resource may be freely copied and distributed, as long as the OCR logo and this message remain intact and OCR is acknowledged as the originator of this work.

OCR acknowledges the use of the following content: n/a

Please get in touch if you want to discuss the accessibility of resources we offer to support delivery of our qualifications: resources.feedback@ocr.org.uk

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Apply the addition law of probability			
AO1	2	Calculate simple probability			
AO1	3	Calculate simple probability			
AO1	4	Calculate simple probability			
AO1	5	Calculate simple probability			
AO1	6	Calculate simple probability			
AO1	7	Calculate relative frequency			
AO1	8	Apply the addition law of probability			
AO1	9	Calculate a probability			
AO1	10	Draw a sample space diagram			
AO2	11	Calculate probabilities from a sample space diagram			
AO2	12	Interpret probability			
AO2	13	Draw a tree diagram			
AO2	14	Calculate probability from a tree diagram			
AO2	15	Compare a relative frequency to an expected outcome			
AO3	16	Calculate a probability of two independent events both happening			
AO3	17	Use systematic listing to calculate a probability			
AO3	18	Calculate a conditional probability			
AO3	19	Calculate a probability of repeated events			
AO3	20	Calculate a probability in context			

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Apply the addition law of probability			
AO1	2	Calculate simple probability			
AO1	3	Calculate simple probability			
AO1	4	Calculate simple probability			
AO1	5	Calculate simple probability			
AO1	6	Calculate simple probability			
AO1	7	Calculate relative frequency			
AO1	8	Apply the addition law of probability			
AO1	9	Calculate a probability			
AO1	10	Draw a sample space diagram			
AO2	11	Calculate probabilities from a sample space diagram			
AO2	12	Interpret probability			
AO2	13	Draw a tree diagram			
AO2	14	Calculate probability from a tree diagram			
AO2	15	Compare a relative frequency to an expected outcome			
AO3	16	Calculate a probability of two independent events both happening			
AO3	17	Use systematic listing to calculate a probability			
AO3	18	Calculate a conditional probability			
AO3	19	Calculate a probability of repeated events			
AO3	20	Calculate a probability in context			