

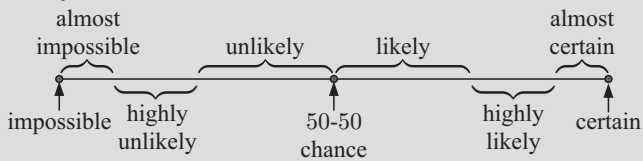
CHAPTER 12: PROBABILITY

12A DESCRIBING PROBABILITY

REMINDER

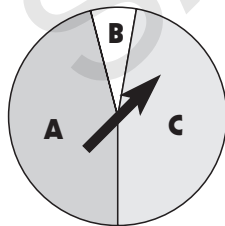
The **probability** of an event is the likelihood or chance of it occurring.

Words which can be used to describe the probability of something happening, in order from least likely to most likely, are shown below.



- 1 Using a word or phrase, describe the chance of the following occurring:
 - a The next baby born at Queen Elizabeth Hospital will be a boy.
 - b The highest July temperature in Hobart this year will be over 40 degrees Celsius.
 - c A house in your street will have a power failure at least once this year.

- 2 Using a word or phrase, describe the chance of the following occurring:



- a The spinner will stop on the sector marked B.
 - b The spinner will stop on a sector marked D.
- 3 A bag contains 24 green marbles and 1 orange marble. A marble is randomly selected from the bag. Describe the chance of the following occurring.
 - a The selected marble will be green.
 - b The selected marble will be orange.
 - c The selected marble will be green or orange.

- 4 Determine whether event *A* or event *B* is more likely to occur:

A: It will snow in Darwin next summer.

B: It will snow in Mount Hotham next June.
- 5 You have five red discs and five yellow discs, and must place *four* discs in a bag. What discs would you place in the bag if:
 - a you want to be certain of drawing out a yellow disc
 - b you want it to be impossible to draw out a yellow disc
 - c you want a 50-50 chance of drawing out a yellow disc
 - d you want it to be more likely to draw out a yellow disc than a red disc?

12B ASSIGNING NUMBERS TO PROBABILITIES

REMINDER

If it is **impossible** for an event to occur, we assign it the probability 0 or 0%.

If an event is **certain** to occur, we assign it the probability 1 or 100%.

The probability of any event occurring lies between 0 and 1, or 0% and 100% inclusive.

- 1 Match the following probability values with the most appropriate word or phrase:

a 0.4	b 0.95	c 0.2
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A almost certain B highly unlikely
 C unlikely
- 2 Match the following events with the most appropriate probability value:
 - a One of the clocks in your school will need a battery replaced in the next 3 years.
 - b There will be a full moon in the next month.

c The next car which is sold at a particular car dealership is silver in colour.

A 1 B 0.8 C 0.2

3 The table alongside shows the probability of Warren being on time for school on different days of the week.

Day	Probability
Monday	23%
Tuesday	80%
Wednesday	60%
Thursday	48%
Friday	95%

a On which day is Warren:
i most likely

ii least likely to be on time?

b Is Warren more likely to be on time on Wednesday or Thursday?

c True or false?

i Warren is highly likely to be on time on Tuesday.

ii It is almost impossible that Warren will be on time on Friday.

4 Soccer players Ryan, Eric, and Gary each shoot for goal in a penalty shoot-out. Ryan has probability $\frac{3}{4}$ of shooting a goal, Eric has probability 0.89 of shooting a goal, and Gary has probability 78% of shooting a goal.

a Write each of the probabilities as a percentage.

b Write a word or phrase to describe the probability that Ryan will shoot a goal.

c Who is most likely to shoot a goal?

5 Between the hours of 10 am and 3 pm on any day of the week, Margie will be at work, at home, or at a course. She is at work $\frac{4}{7}$ of the time, at home $\frac{2}{7}$ of the time, and at a course $\frac{1}{7}$ of the time.

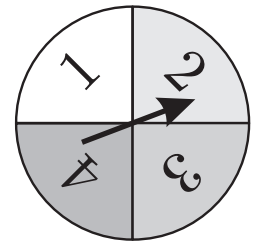
a On any particular day, where is Margie most likely to be?

b Find the probability that, on a particular day, Margie is *either* at work *or* at home.

12C

POSSIBLE OUTCOMES

1 a What are the possible outcomes when this spinner is spun?



b How many possible outcomes are there?

2 One of these bowling balls will be selected for Dan's next bowl:



a What are the possible outcomes for this selection?

b How many possible outcomes are there?

c How many of the outcomes are vowels?

3 Look at this calendar for the month of November.

NOVEMBER						
S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Ingrid needs to select a Saturday night in November to hold a party.

a What are the possible outcomes?

b The party is being held to celebrate Ingrid's birthday on the 12th of November. How many of the outcomes are *after* her birthday?

4 Frank is choosing a city to visit in Germany for his next holiday. He has asked his German penpal to suggest cities he should visit.




- a How many possible outcomes are there?
- b How many of the outcomes start with H?

12D CALCULATING PROBABILITIES

REMINDER

In situations where the possible outcomes are equally likely:

$$\text{The probability of an event occurring} = \frac{\text{number of outcomes corresponding to the event}}{\text{total number of possible outcomes}}$$

- 1 Suppose an ordinary 6-sided die is rolled once.
- 
- a List the possible outcomes.
 - b How many possible outcomes are there?
 - c Find the probability of rolling:
 - i a 3
 - ii a 4
 - iii a number greater than 3.
- 2 Tickets numbered 1 to 50 are handed out to participants at a quiz night. A number from 1 to 50 is randomly selected, and the person holding the ticket with that number wins a prize.
- a How many possible outcomes are there for the selection of the winning ticket number?
 - b Find the probability that the winning ticket number is:
 - i 26
 - ii 15 or 16

iii a multiple of 5.

- 3 Helga bought 8 new pairs of socks. Three of the pairs were knee-high length, two pairs were crew length, and three pairs were ankle length. Helga randomly selected one of the pairs of socks to wear. Find the probability that the pair of socks she selected was:
- a crew length
 - b crew length or ankle length.
- 4 A bag contains 2 red marbles, 4 white marbles, and 3 yellow marbles. A marble is selected at random from the bag. Find the probability of selecting:
- a a red marble
 - b a white or yellow marble.
- 5 Graeme has 15 carrots, 2 beetroots, and 3 parsnips growing in his garden. He randomly selects one of these vegetables from his garden to have with his evening meal.
- a Find the probability that Graeme selects a carrot. Give your answer as:
 - i a fraction
 - ii a percentage
 - iii a decimal.
 - b Use a word or phrase to describe the probability of Graeme selecting a carrot.
- 6 Diana randomly selects an egg from a carton of 12 eggs. 3 of the eggs are brown, 5 are white, and 4 are speckled.
- a Find the probability that Diana selects:
 - i a white egg
 - ii a brown egg.

- b Is Diana more likely to select a white egg or a speckled egg?

REVIEW OF CHAPTER 12

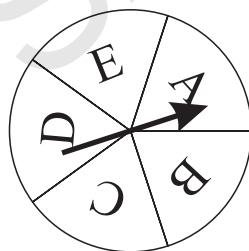
1 Describe, using a word or phrase, the probability of the following:

- a The sun will never rise again.
- b You will speak to someone with a name starting with S before this week is over.

2 You have four green cards, four yellow cards, and four white cards, and must place any three of them in a hat. What cards should you place in the hat if:

- a you want it to be impossible to draw out a yellow or white card
- b you want to be certain to draw out a white card
- c you want there to be an equal chance of drawing out a green, yellow, or white card?

3 a What are the possible outcomes when this spinner is spun?



- b How many possible outcomes are there?
- c Are the outcomes equally likely?

4 Angus placed 25 tokens numbered from 1 to 25, into a bag, then drew one out at random. Find the probability that Angus drew out:

- a a token numbered 18
- b a token with a two digit number on it.

5 Write a word or phrase to describe the probability value:

- a 0.86
- b 0
- c 0.42

6 Jessie is playing Henry in a game of cards. Jessie has probability 0.76 of winning, and Henry has probability 0.24 of winning.

- a Who is more likely to win the game?
- b Find the sum of the probabilities. Explain your answer.

7 Look at this calendar for the month of April.

APRIL						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

Gwen selects a day during April at random. Find the probability that the day is:

- a the 20th
- b a Tuesday
- c a weekday.

8 Solizna has 7 black buttons, 3 clear buttons, and 5 silver buttons on a jacket. One of the buttons falls off in the wash. Find the probability that the button which fell off was:

- a black
- b clear or silver.