

5

Tree Diagrams

You will need

- counters

Goal

Use a tree diagram to determine a theoretical probability.

Jorge and Isabella are playing a board game with a die. Jorge is two spaces behind Isabella. They each roll a die and move forward that many spaces.



? What is the theoretical probability that Jorge and Isabella land on the same space after one roll each?



Jorge's Method

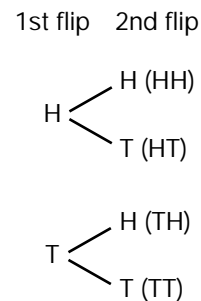
I'll draw a **tree diagram** to show all the possible outcomes when we each roll once. I'll move counters to see what space we each land on.

Jorge's Roll	Isabella's Roll	Same Space?
1 (brown)	1 (orange)	
	2 (brown)	✓
	3 (green)	
	4 (blue)	
	5 (purple)	
	6 (gray)	
2 (red)	1	
	2	
	3	
	4	
	5	
	6	

✓ means we landed on the same space

tree diagram

A way to record and count all combinations of events, using lines to form branches. This tree diagram shows all the things that can happen if you flip a coin twice.



- A. Copy and complete Jorge's tree diagram to show all of the outcomes. How could you predict that there would be 36 branches?
- B. For how many of those outcomes did Jorge and Isabella land on the same space?
- C. What is the theoretical probability that the two will land on the same space?

Reflecting

1. Why does each branch of the tree represent one of the possible outcomes?
2. The probability of landing on the same space can be expressed as a fraction. How do you use the tree diagram to determine the denominator? The numerator?

Checking

3. Determine the theoretical probability that Jorge and Isabella will land on spaces next to each other. Use the tree diagram.

Practising

4.
 - a) Use a tree diagram to list the possible outcomes if the spinner is spun twice.
 - b) Determine the theoretical probability that the difference of the numbers is 1.
 - c) Determine the theoretical probability that the product of the numbers is 4.

5. Randomly choose two different vertices of the hexagon.
 - a) Determine the theoretical probability that a line segment joining them is longer than the side length of the hexagon. Use a tree diagram.
 - b) Determine the theoretical probability that the letters of both vertices come before E in the alphabet.

6. Use a tree diagram to show why the Lucky Seven game in Getting Started on page 388 is not fair.

