MATHS

Lesson 6

Year 9

Topic: Linear and non-linear relationships

Introducing gradients

Today you will:

- explore the concept of slope.

Resources

Digital

Video — Introducing slope (1:06)

Find and prepare

Sheet 4 — Cartesian plane

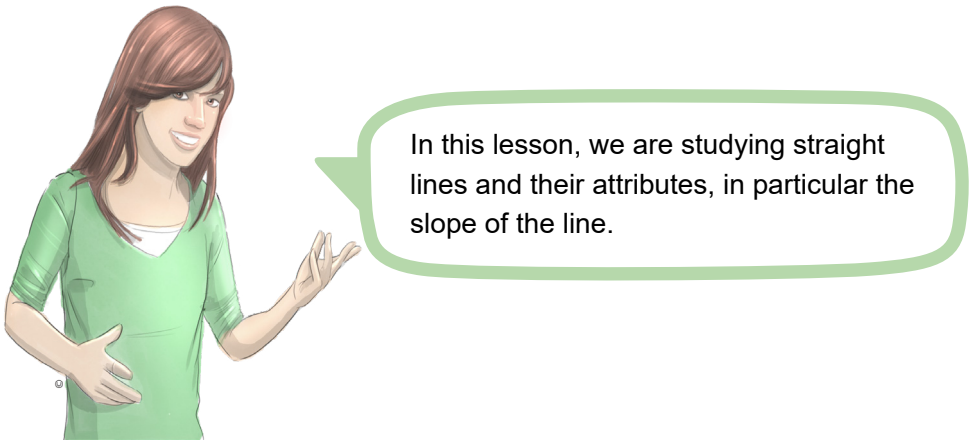
Sheet 5 — Tell a story

Key terms

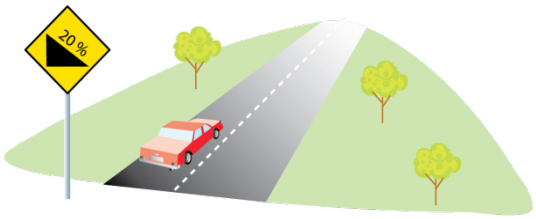
For definitions and explanations of terms, please see the Glossary.

Lesson

Slopes in real life







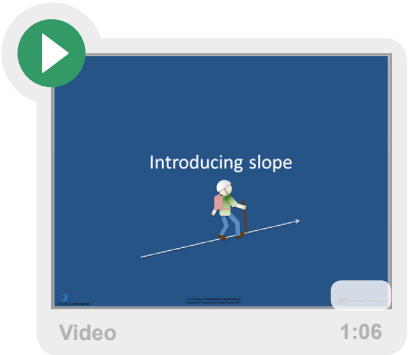
1. Consider what you already know about the term ‘slope’ to answer to following questions:

   a. What is a slope?

   b. Give an example of a steep slope and describe what makes it steep.

   c. What are some terms we use to describe slopes?

2. Watch the **Video — Introducing slope**.



Queensland Government

Use sentences to describe the relationship between steepness and ratio

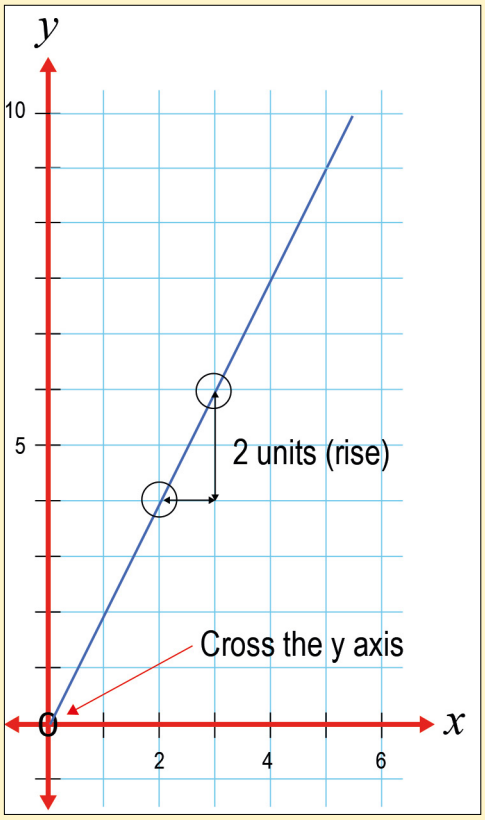
When comparing lines on a graph, it is helpful to be able to describe each line clearly and consistently. Before we start using numbers and symbols in this situation, we are going to use word statements to describe the lines.

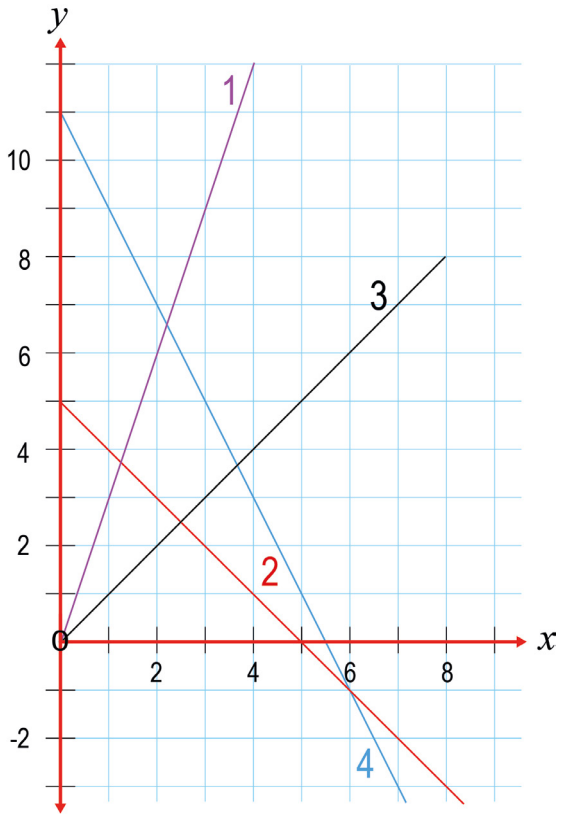
When we use word statements to describe a line, there are three parts to the description:



- if the slope is positive (going up) or negative (going down) as you look from left to right
- the steepness of the slope (gradient) (this concept will be looked at in the next lesson)
- where the line crosses the y-axis.

In this example, the line is described as: a positive slope, as it goes up 2 units for every 1 unit it goes right and it crosses the y-axis at 0.





3. For the lines in the graph above, complete the sentences that describe the lines. The first two have been completed for you.

Line 1 is a positive slope, as it goes up [3 units for every 1 unit it goes right] and it crosses the y-axis at 0.

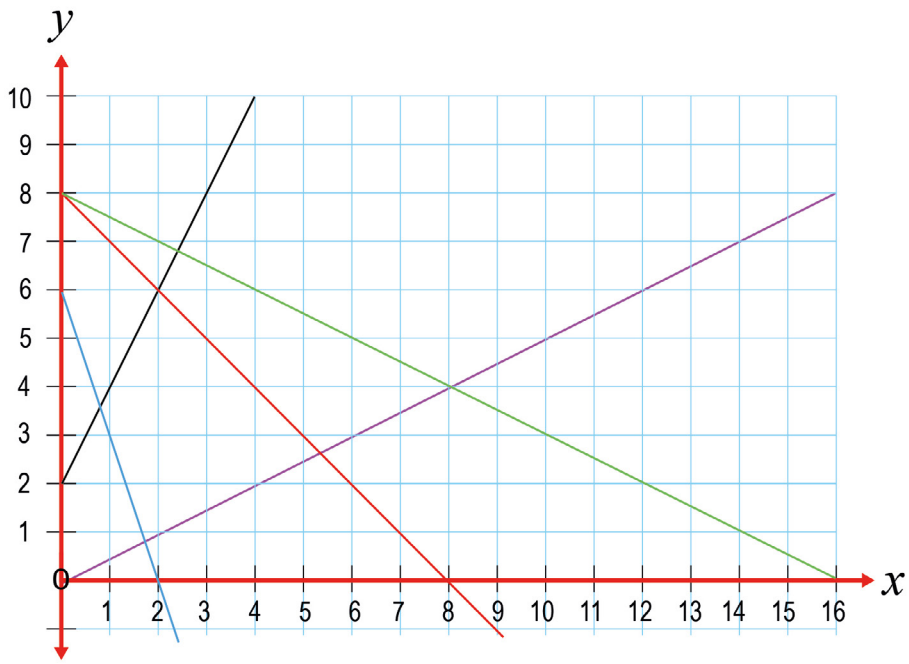
Line 2 is a negative slope, as it goes down [1 unit for every 1 unit it goes right] and crosses *the* y-axis at 5.

Line 3 is a [ ] slope, as it goes [ ] unit/s for every unit it goes right and it crosses the y-axis at [ ].

Line 4 is a [ ] slope, as it goes [ ] unit/s for every unit it goes right and it crosses the y-axis at [ ].

Queensland Government

4. Use sentences to describe each of the lines on the following axes.



Example: Line 1 (red) is a negative slope, as it goes down 1 unit for every 1 unit it goes right and it crosses the y-axis at 8.

Line 2 (black)

Line 3 (blue)

Line 4 (purple)

Line 5 (green)

5. Now see if you can reverse the process. Create and draw lines on a graph (use **Sheet 4 —** Cartesian plane) to represent the four lines described in the following:

   Line A goes up 4 units for every unit it goes right and it starts at 0 on the y-axis.

   Line B goes down 2 units for every 1 unit it goes right, starting at 6 on the y-axis.

   Line C only rises 1 unit for every 8 units it goes right, starting at 0.

   Lines D rises 10 units for every 5 units it goes right, starting at −1 on the y-axis.

   Which of the lines have a positive slope?

6. Open **Sheet 5 —** Tell a story.



The distance covered by four objects over a period of time has been graphed. Although they all started moving in the one direction, some of the objects have stopped or changed how they moved.

7. Interpret the graph to tell a story about what the graph might represent. The four objects could be four things moving at the same time (for example: cars racing), or the same object being recorded on four different trips (a person leaving their house each day).

   Write a short paragraph that matches the graph.