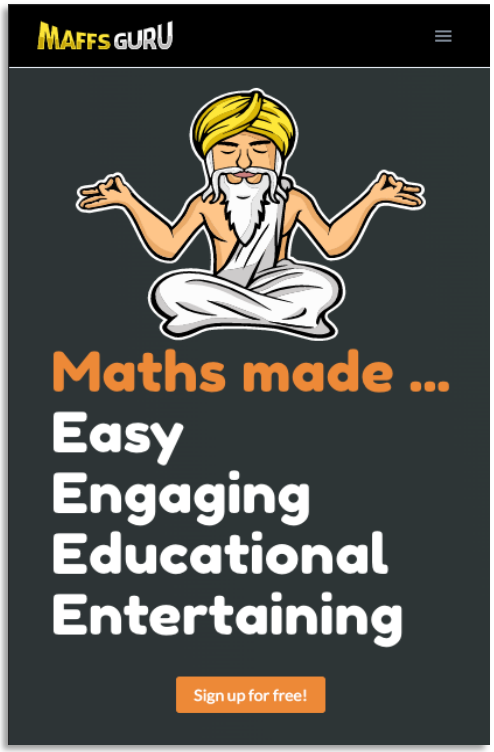
Non-linear graphs

Year 12 Further Mathematics
Units 3 and 4

www.maffsguru.com



Learning Objectives

By the end of the lesson I would hope that you have an understanding and be able to apply to questions the following concepts:

- Understand what a non-linear graph is
- Know how to interpret a non-linear graph

Recap

In the previous lessons we have looked at line segment graphs and step graphs. These are effectively the same idea.

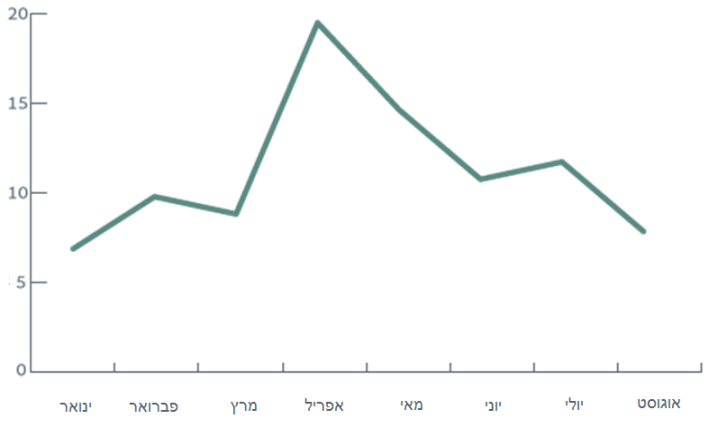
We noticed that the graphs were made up **straight line** sections. These sections are otherwise known as **linear** sections**.**

Linear means straight.

So, what would non-linear mean?

Not straight!

Welcome to this lesson on non straight lined graphs!



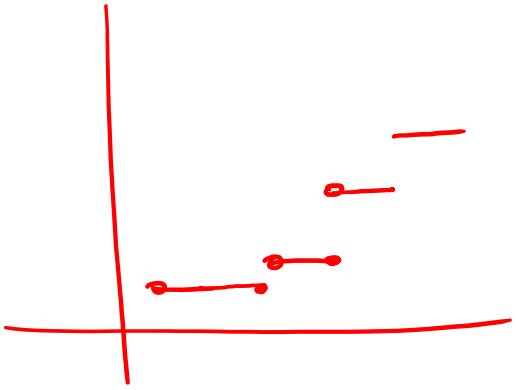
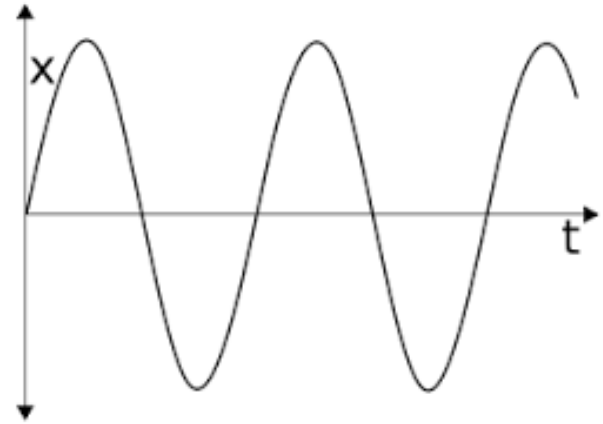


Image source: Wikipedia

Examples of non-linear graphs

Here are some examples of non-linear graphs.



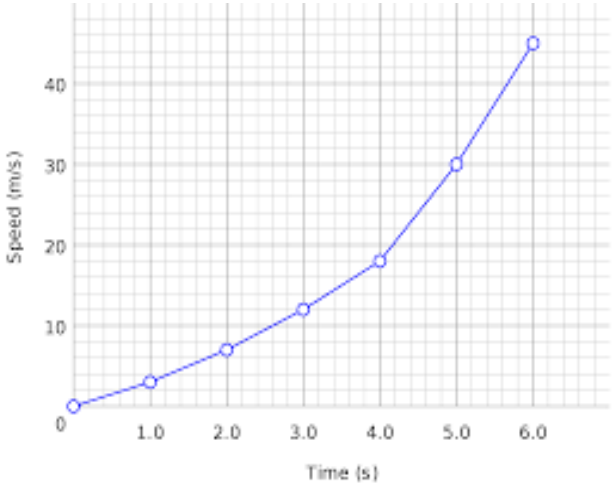


Image source: Wikipedia

And one I didn't know had a rude word associated with it …

Rectum is actually Latin for straight.
Latus means wide or broad.

And we will leave the rest of that one there!

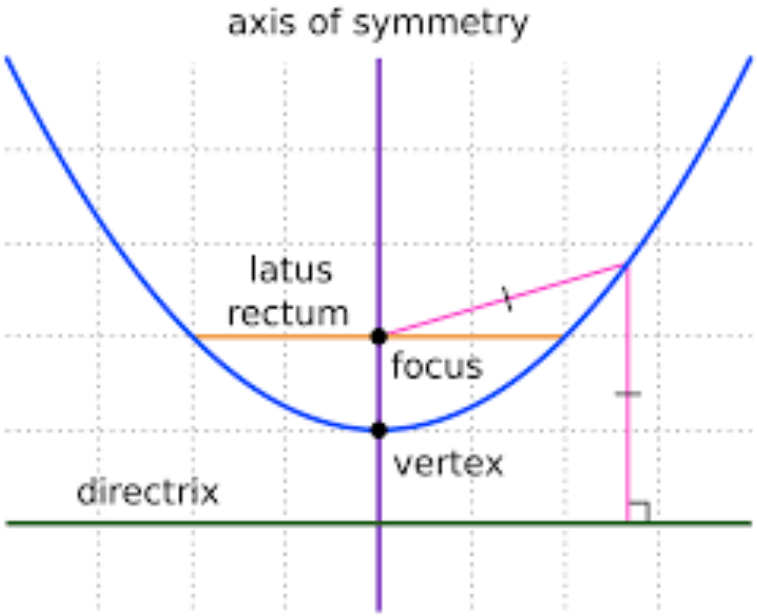


Image source: Wikipedia

Everything else stays the same

The good news … We can still read the graph in the same way as we would a straight line graph. So, we can use an example …

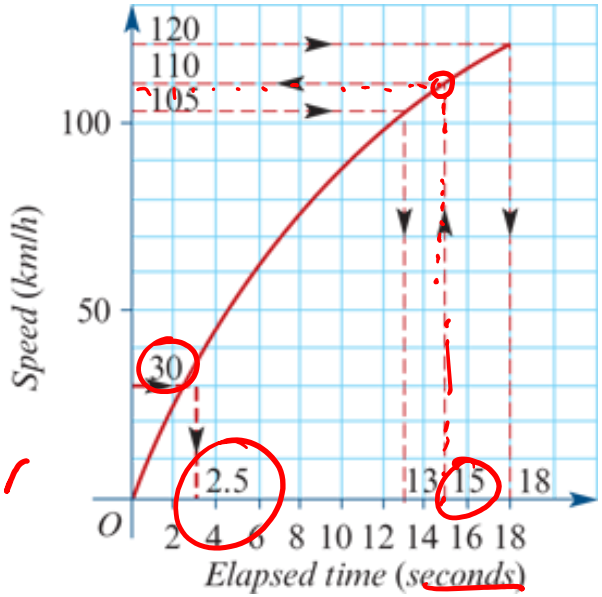
The graph represents the speed against time of a particular make of car.

What was the speed of the car after 15 seconds?

After how many seconds did the car reach the following speeds?

- *30 km/h*
- *105 km/h*
- *120 km/h*

15 secs ≈ 110 km/hr



Examples have been extracted, with permission, from the Cambridge Further Mathematics Units 3 and 4 Textbook

Plotting a non-linear graph

The population (in millions) of an island country for the years 1811 to 1951 is given in this table. A census is taken every 10 years (but not during war years).

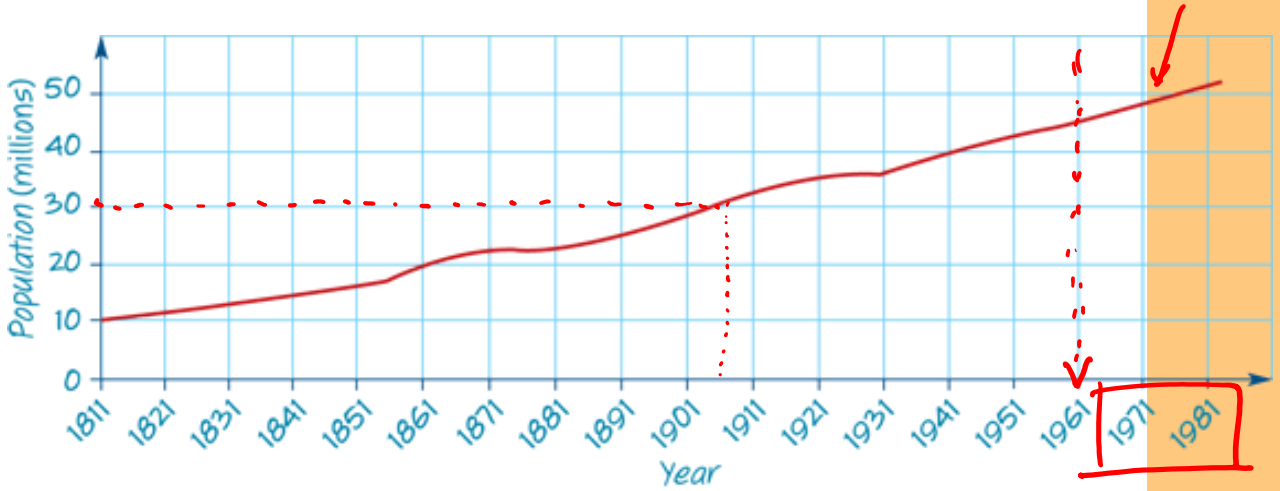
Plot the graph.

Estimate the population in:

- 1905
- 1971.

30 million

Plotting the graph is going to take forever … so here is one Cambridge produced earlier …



Important points!

Make sure the axes are labelled
Make sure the spacing between the numbers is uniform
You don't have to start at zero with the axes
Make sure you join all the points together (don't use straight lines!)

Examples have been extracted, with permission, from the Cambridge Further Mathematics Units 3 and 4 Textbook

Interpolation and extrapolation

We're back to this one again.

Remember in the core module we looked at the difference between **interpolation** and **extrapolation**.

When we are looking at a value within the data range we are interpolating.
When we are looking at a value outside of the data we've been given, we are extrapolating.

Interpolation is generally thought to be more accurate than extrapolation.

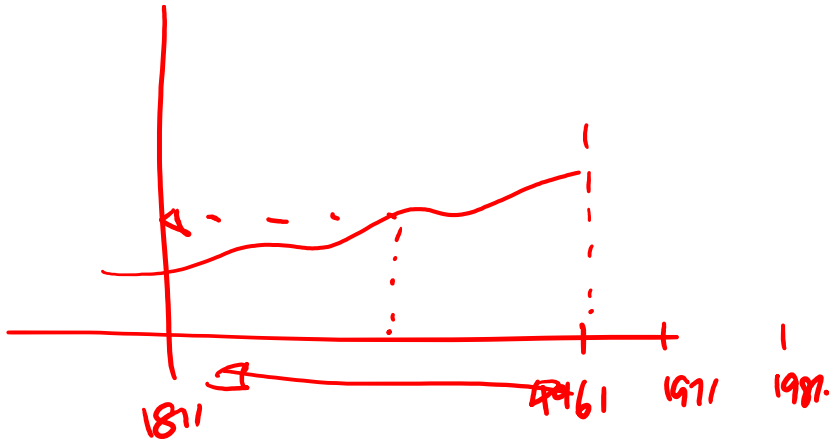


Image source: Year 12 Further Mathematics Textbook (Units 3 and 4)

All videos are available to view at
www.maffsguru.com
Lesson notes can be downloaded too

Please visit
www.youtube.com/maffsguru
and subscribe