Line graphs

By the end of the lesson I would hope that you have the knowledge and understanding for the following points:
- Understand what a line graph is
- Know how to read a line graph
- Know that a line graph is used to show **continuous numerical data**
- Know how to read travel graphs

RECAP

We are looking at all the work which is in the Data Representation section of the course.
Data is everywhere and pretty much decides a lot of what you do in Mathematics.
For example, the results from your pre- and post-tests decide what groups you go into and by how much you have grown.

Data is also used to help people make decisions e.g. conducting a survey might provide a Leisure Centre important information about the facilities it needs to include. Or how many running machines to include in the gym.

Last lesson we looked at Dot plots and column graphs.
These were used to show discrete numerical or categorical data.

It's time to look at **Continuous Numerical Data**.

Line graphs

Look at the following two graphs and ask yourself the following questions?
- What does each graph show you?
- Why would we need two graphs?
- What do the blue dots show us?
- Why are the lines between the blue dots red?
- Can we describe (in words) what the graphs are showing us:
  - Individually,
  - In comparison with each other?
- Can we use the graphs to read values from?
- What did you notice about the variable which was placed on the x-axis?
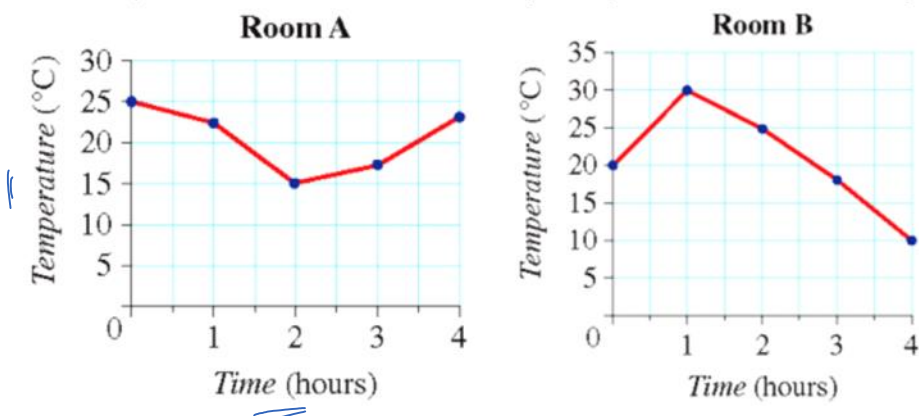
Important information about line graphs

Line graphs are used to show continuous numerical data.
The dots represent points in time and values which have been measured.
The lines between the dots are our best estimate of what we think happened between the points we measured.
Time usually goes on the horizontal axis.
We normally compare graphs, hence why we have two.
We like to describe the **trends** in the data using sentences.

Sometimes we might need to make an educated guess about what might lead to a change in a line graph.
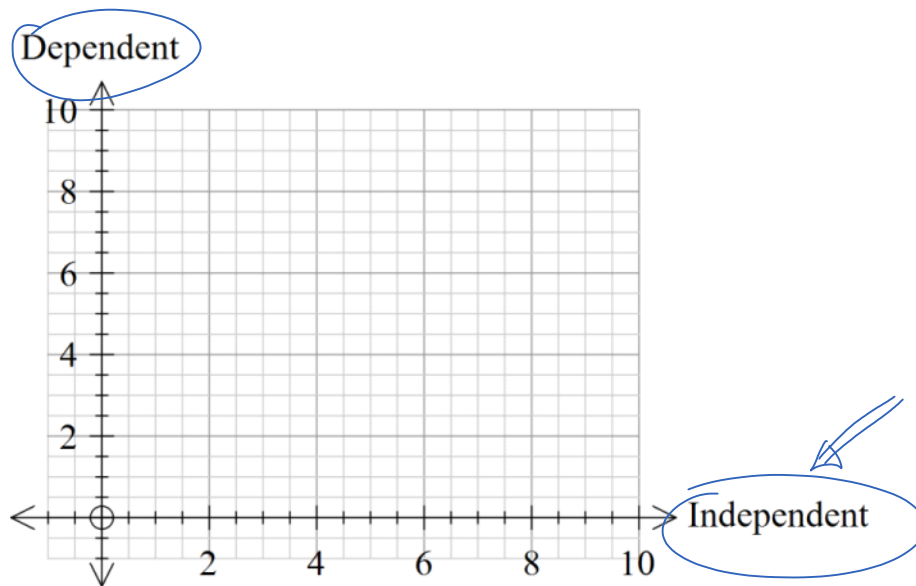
Example:

What would we now know if, for the graphs below, we knew there was an air-conditioning unit in the room where we were measuring the temperature.

How do I draw a line graph?

The most important thing with any graph is ensuring you have the right variable on the right axis.
Later in school you will be told the following:
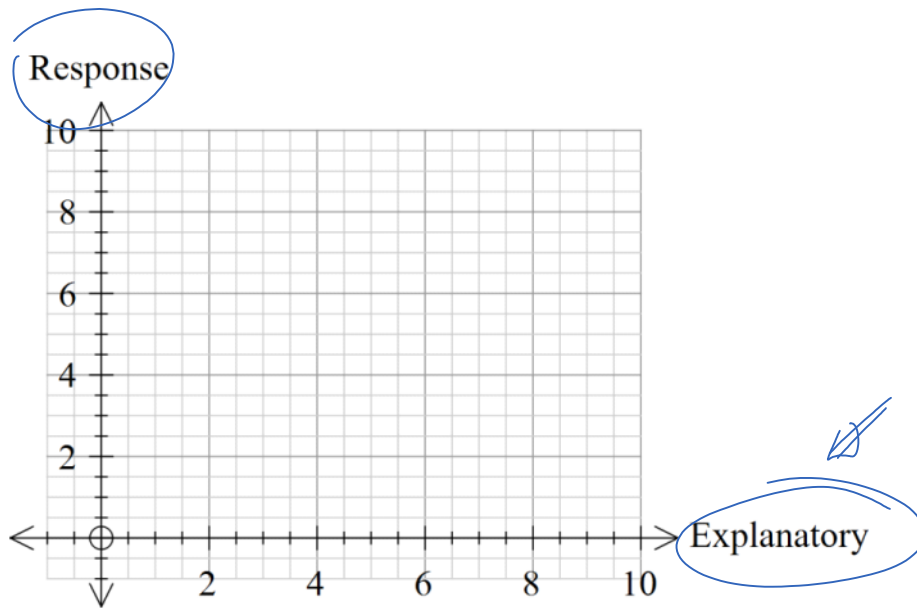
Another way might be using the words Independent and Dependent.

As we can't change time, we tend to put time on the Independent axis.
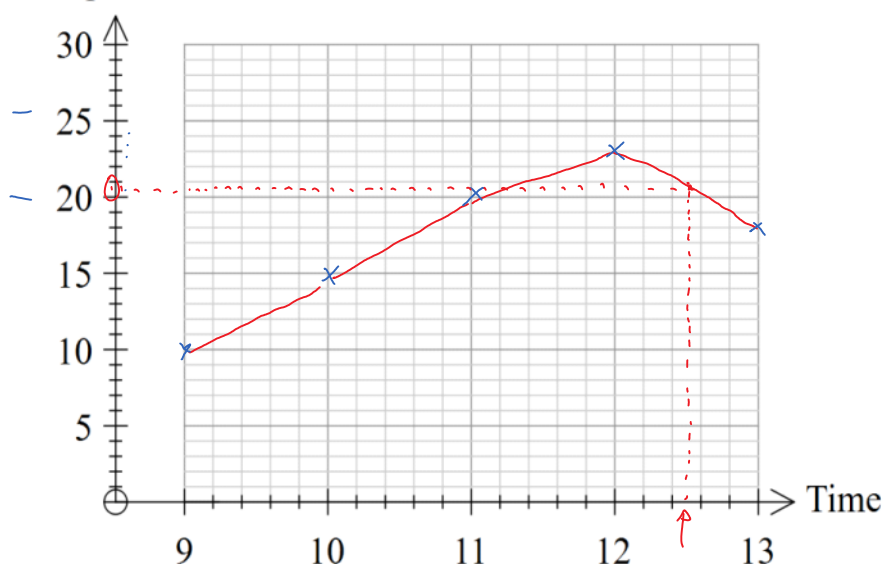
Example:

Time	9:00 am	10:00 am	11:00 am	12:00 pm	1:00 pm
Temperature (°C)	10	15	20	23	18

a   Present the results as a line graph.

b   Use your graph to estimate the room temperature at 12:30 pm.   20·5°c
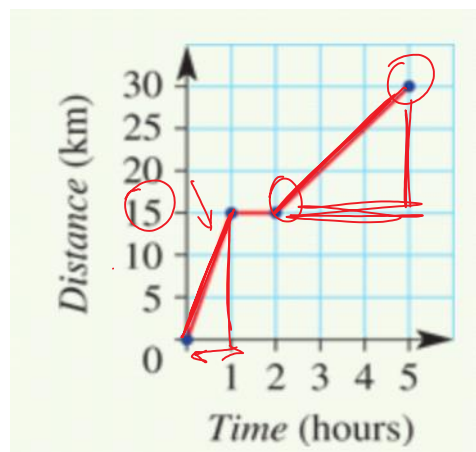
Temperature

Travel Graphs

Many times, in Mathematics, we are asked to read travel graphs.
These will be graphs that show some form of journey.

An example is shown below:

1hr   15 Km

3hrs   15 Km

What does the graph show me?
Can I describe that is happening?
How are time and distance related?
Where did I start from?
Where did I go to?
How long did it take me?
How far away was the place I was visiting?
Did I stop at any time?
Did I go the same speed at all points on my journey?

This one graph has all the questions above, and perhaps a few more.

Knowing how to read the graph is 90% of the Mathematics.
Once we know what the graph is showing we can answer any question an exam throws at me.

Example:
Taken from the Cambridge Essentials Textbook Series

This travel graph shows the distance travelled by a cyclist over 5 hours.

a How far did the cyclist travel in total? ~~30 km~~

b How far did the cyclist travel in the first hour? ~~15 km~~

c What is happening in the second hour? ~~Shopped~~

d When is the cyclist travelling the fastest? ~~1st hour~~

e In the fifth hour, how far does the cyclist travel? ~~5 km~~
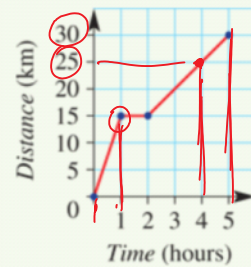
30 − 25
= 5 km

The most important thing to look for in any graphs are what the axes stand for.
Once you know what the graph is showing, you should be able to use common sense to help you find the answers.