Cubic Graphs Investigation

A cubic expression is one which contains an x^3 term, usually in addition to some or all of an x^2 term, an x term and a number.

A cubic equation can be plotted on a graph (see example opposite).

The Investigation:
Use GeoGebra to investigate the different shapes a cubic graph might take.

You should include:
- **Screen-shots** of the graphs you have plotted.
- The **graph equations** used to generate them.
- A **brief description** of the shape of each curve. This should include notes on **where it crosses each axis**, any points **where the gradient becomes zero** and **what happens as x becomes very large or very small**.

You should consider:
- What is the effect of changing **only** the number part / the x part / the x^2 part / the x^3 part.
- What effect does changing the sign (positive/negative) of the x^3 part have?

Example: *(note: your investigation will include a number of different graphs – this single graph is given to show you what to include)*

$$y = x^3 + 2x^2 - 5$$
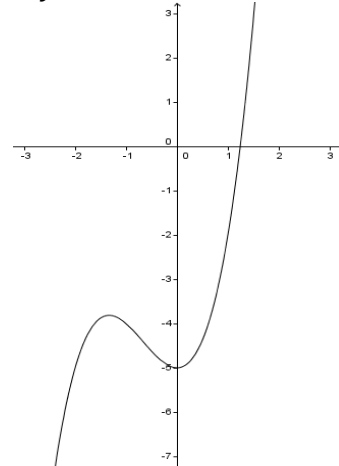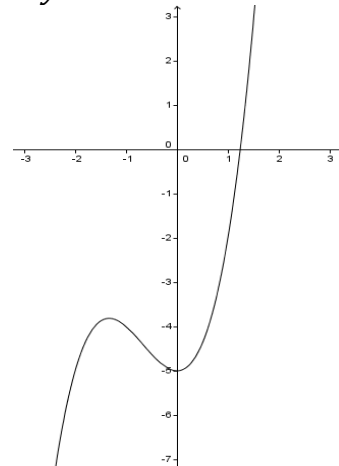
This curve crosses the y-axis at $(0, -5)$, and crosses the x axis at around $(1.24, 0)$.

It has a local maximum at around $(-1.38, -3.82)$, and a local minimum at around $(0, -5)$.

As x gets larger, y gets larger without limit.
As x gets smaller, y gets smaller without limit.

Cubic Graphs Investigation – Extra Information

Remember you can use your "Introduction to GeoGebra" to remind you of the basics.
(available online at http://thechalkface.net/resources/introduction_to_geogebra.pdf)
GeoGebra is available as a free download, a tablet app or even directly through a browser at GeoGebra.org

Equations for graphs can be entered by typing directly into the input bar:

Input: y=3*x^3-4*x^2+7x-5

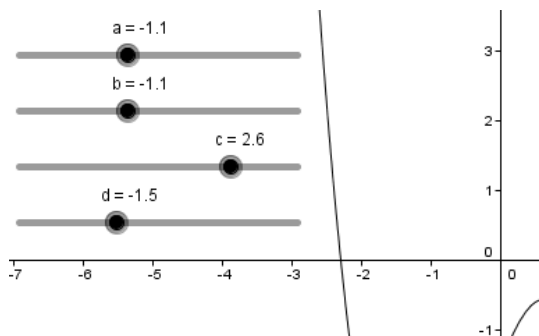Expressions use the same format as Excel or Google:

5*x	$5x$
4*x^3	$4x^3$
(2/3)*x^2	$\frac{2}{3}x^2$

You can also use sliders to generate a graph that is easily altered:

Type in:

   y=a*x^3+b*x^2+c*x+d
and click 'Create Sliders'.