EXPLORING CUBICS OF THE FORM $(x + p)(x + q)(x + r)$

STUDENT RESOURCE

- Draw the graph of $y = (x - 1)(x + 2)(x - 3)$ on suitable axes on your computer or graphics calculator.
  Make a note of where it crosses the **x**- and **y**-axes.
  Make up some similar examples with different numbers and explore where they cross the x- and y-axes.
  Make a conjecture about how to predict where the graph will cross the axes.
  Try to convince someone else of the truth of your conjecture.

- Draw the graph of $y = (x - 1)(x + 2)(x - 3)$ and $y = 2(x - 1)(x + 2)(x - 3)$ on suitable axes on your computer or graphics calculator.
  Describe the similarities and differences between the two graphs.
  Draw the graph of $y = (x - 1)(x + 2)(x - 3)$ and $y = 3(x - 1)(x + 2)(x - 3)$.
  Make up some of your own.
  Describe the effect of multiplying by a constant.
  What happens if the constant is negative?

- Draw the graph of $y = (x - 1)(x + 2)(x - 3)$ and $y = (x - 1)(x + 2)(x - 3) + 5$ on suitable axes on your computer or graphics calculator.
  Describe the similarities and differences between the two graphs.
  Make up some of your own.
  Describe the effect of adding a constant.
  What happens if the constant is negative?

- Draw the graph of $y = (x - 1)(x + 2)(x - 3)$ and $y = (2x - 1)(2x + 2)(2x - 3)$ on suitable axes on your computer or graphics calculator.
  Describe the similarities and differences between the two graphs.
  Make up some of your own.
  Describe the effect of multiplying each **x** by a constant.
  What happens if the constant is negative?