Investigation

"How does the equation $y = a(x - r)(x - s)$ relate to its graph?"

1. Create a table of values for the equation $y = 2(x - 1)(x + 3)$.

    In your table, use integer values of x from -6 to 6 and then calculate the y values.

2. Use first and second differences to show that this is a quadratic relation.

3. Graph the relation.

4. Identify the x-intercepts. How do they relate to the equation?

5. Identify the co-ordinates of the vertex.

    If you hadn't drawn a graph, how could you use the x-intercepts to find the co-ordinates of the vertex?

6. Summarize your findings.

    That is, describe how to determine the x-intercepts and vertex of any quadratic equation in the form:

    $$y = a(x - r)(x - s)$$

7. Use your method to analyse the relation $y = -\dfrac{1}{2}(x + 2)(x - 6)$ and then sketch its graph.