Understanding quadratic equations

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- Describe the shape of the quadratic curve. If $a = 0$ is the equation still a quadratic?

- Describe the shape of the curve when $a > 0$ and when $a < 0$.

- Consider a quadratic equation in which $b = 0$. What effect does changing the value of c have on the curve? What effect does changing the value of a have?

- If $f(x) = x^2$ then $f(0) = 0$. Setting $a = 1$ can you find values of b and c so that $f(1) = 0$, $f(-1) = 0$? Can you generalise this and write expressions for the coefficients b and c in terms of the α value for which $f(\alpha) = 0$? Can you find some form other than $ax^2 + bx + c$ in which we might write **these particular quadratics** ?

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- Thinking about your answer to the previous question what other forms have we used to express quadratic equations? Take a quadratic expressed in this form, convert it to $ax^2 + bx + c$ form and use the sliders to plot the graph of this function. What do you notice about the points where the curve crosses the x axis? Explain why the curve crosses the x-axis at these particular points?

- Suppose you were now given a quadratic equation and asked to sketch the curve. What four things would it be important to indicate in your diagram?

- Use the information in the textbook and describe how you would determine each of the four things that you identified in the previous question.