Coefficients *a* and *c*

Let's look at the notation for a quadratic function.

It can be written in **general form**, in function notation, as $f(x) = ax^2 + bx + c$, where *a*, *b*, and *c* are called **coefficients**.

Use the applet to change the coefficients of the function to $f(x)= 2x^2 + 5x + 1$ and graph it.

What happens if you change the *a* or *c* sliders? Let's find out.

Before moving on, here is an important definition: the **vertex** is the point where the graph changes direction. In the parabolas shown in this applet, the vertex is either a minimum (the lowest point), or a maximum (the highest point).

Using the applet, adjust the "*a*" slider to a negative value, for example, (negative) -2, you can see that the parabola opens downwards and that the vertex is at a maximum, at the top of the parabola.

If you adjust the "*a*" slider back to (positive) +2

… you can see that the parabola opens upwards and that the vertex is at a minimum, at the bottom of the parabola.

When you adjust the value of the "*a*" slider to negative -3 and the "*c*" slider to (negative) -4,

… the function changes to $f(x) = -3x^2 + 5x + - 4$.

The maximum vertex is located at the ordered pair where x – 0.83, and y = -1.92

You can also see the y-intercept at (0, -4)

Notice that in this function, there are no x-intercepts because the parabola never crosses the x-axis.