Two Takes on Completing the Square

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On the right is some inappropriate review of a process that you learned, and then were told to forget *as* an agency for solving a quadratic equation. The process was mainly used to develop the world's leading method for solving a quadratic equation, namely, the quadratic formula. You were told, less often, that the skills involved would be used elsewhere. On the left is one of those "elsewheres": changing the form of a quadratic *function* as an aid in graphing. This page is an attempt to settle confusion about completing squares, namely,

When do we add to both sides, and when do we add and subtract from *just one side*?

The answer is,

Quadratic function $y = f(x) = ax^2 + bx + c$ in general. $y = f(x) = 2x^2 + 3x + 1$ (specific example) …when re-writing a quadratic function in vertex form. **Add and subtract on the same side** here. $y = f(x) = 2\left(x^2 + \frac{3}{2}x + \left(\frac{1}{2} \bullet \frac{3}{2} \right)^2 \right) - 2\left(\frac{1}{2} \bullet \frac{3}{2} \right)^2 + 1$	Quadratic equation: $ax^2 + bx + c = 0$ in general. $2x^2 + 3x + 1 = 0$ (specific example). …when told to solve by completing the square, or… **Add the same thing to both sides** here. … when developing the quadratic formula from the above equation -- you added $-c$ and later $\frac{b^2}{4ac}$ to both sides.

Worth noting:

- Quadratic functions on the left generate many pairs of values x, y and hence the parabola graphs.
- For the specific pairs when $y = 0$, the quadratic function suddenly becomes the quadratic equation on the right. The results are the points where the parabola hits the x axis.
- Thus the equation on the right is a specific subset of what is on the left.
- The graphed quadratic *function* is the entire parabola; the subset of that parabola graph of interest to *equation* solver consists of the points where the parabola hits the x axis.