Steps to Proving the Quadratic Formula

Order the steps to show how the quadratic formula is derived by completing the square of the general quadratic equation. The first and last step have been completed.

1	Start with the general quadratic equation:	$ax^2 + bx + c = 0$
2	Expand the bracket $\left(\frac{b}{2a}\right)^2$	$\left(x + \frac{b}{2a}\right)^2 = \frac{b^2}{4a^2} - \frac{c}{a}$
3	Subtract $\frac{b}{2a}$ from both sides of the equation:	$x = -\frac{b}{2a} \pm \frac{\sqrt{b^2 - 4ac}}{2a}$
4	Divide through by a:	$x^2 + \frac{b}{a}x = -\frac{c}{a}$
5	Add $\left(\frac{b}{2a}\right)^2$ to both sides of the equation:	$\left(x + \frac{b}{2a}\right)^2 = \left(\frac{b}{2a}\right)^2 - \frac{c}{a}$
6	Complete the square for $x^2 + \frac{b}{a}x$:	$\left(x + \frac{b}{2a}\right)^2 - \left(\frac{b}{2a}\right)^2 = -\frac{c}{a}$
7	Subtract c from both sides:	$ax^2 + bx = -c$
8	Take the square root of both sides:	$x + \frac{b}{2a} = \frac{\pm\sqrt{b^2 - 4ac}}{2a}$
9	Put $\frac{b^2}{4a^2} - \frac{c}{a}$ over a common denominator:	$\left(x + \frac{b}{2a}\right)^2 = \frac{b^2 - 4ac}{4a^2}$
10	Write the right hand side as a single fraction. This gives the quadratic formula:	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

1									**10**