Proof of the quadratic formula

1. $ax^2 + bx + c = 0$
   (the a quadratic polynomial)

2. $x^2 + \frac{b}{a}x + \frac{c}{a} = 0$
   (dividing by a)

3. $(x + \frac{b}{2a})^2 - \frac{b^2}{4a^2} + \frac{c}{a} = 0$
   (completeing the square)

4. $(x + \frac{b}{2a})^2 = \frac{b^2}{4a^2} - \frac{c}{a}$
   (rearranging)

5. $(x + \frac{b}{2a})^2 = \frac{b^2 - 4ac}{4a^2}$
   (group terms)

6. $x + \frac{b}{2a} = \frac{\pm\sqrt{b^2 - 4ac}}{2a}$
   (square root)

7. $x = \frac{-b}{2a} \pm \frac{\sqrt{b^2 - 4ac}}{2a}$
   (rearrange to make x the subject)

8. $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
   (the quadratic formula)