Solve the following quadratic equation using the quadratic formula.

$$5w^2 + 12w = 8w + 4$$

Quadratic Formula: $ax^2 + bx + c = 0 \implies x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$5w^2 + 12w = 8w + 4 \quad , \quad 5w^2 + 12w - 8w - 4 = 0$$

$$5w^2 + 4w - 4 = 0$$

$$w = \frac{-4 \pm \sqrt{16 - 4(5)(-4)}}{10}$$

$$w = \frac{-4 \pm \sqrt{96}}{10} = \frac{-4 \pm \sqrt{16 \cdot 6}}{10} = \frac{-4 \pm 4\sqrt{6}}{10} = \frac{-2 \pm 2\sqrt{6}}{5}$$