$$\left(\sqrt{a+b}+\sqrt{a-b}\right)^2 - \left(\sqrt{a+b}-\sqrt{a-b}\right)^2$$

Der obige Term hat vereinfacht die Form:

$x^2 - y^2$ wobei $x = \sqrt{a+b}+\sqrt{a-b}$ und $y = \sqrt{a+b}-\sqrt{a-b}$

Nun gilt aber: $x^2 - y^2 = (x+y)(x-y)$

$$x + y = \left(\sqrt{a+b}+\sqrt{a-b}\right) + \left(\sqrt{a+b}-\sqrt{a-b}\right) = 2\sqrt{a+b}$$
$$x - y = \left(\sqrt{a+b}+\sqrt{a-b}\right) - \left(\sqrt{a+b}-\sqrt{a-b}\right) = \sqrt{a+b}+\sqrt{a-b}-\sqrt{a+b}+\sqrt{a-b} = 2\sqrt{a-b}$$

und

$$(x+y)(x-y) = 2\sqrt{a+b}\cdot 2\sqrt{a-b} = 4\sqrt{(a+b)(a-b)} = 4\sqrt{a^2-b^2}$$