∝ Euclid Automated Prover

// Lemma Substitutions //

$$a^2 + 2ab + b^2 \Leftarrow (a + b)^2 \qquad (0000)$$

$$(a + b)^2 - 2ab = c^2 \Leftarrow (a + b)^2 = c^2 + 2ab \qquad (0001)$$

$$a^2 + 2ab - 2ab + b^2 \Rightarrow a^2 + b^2 \qquad (0002)$$

// Axioms (Syntax & Semantics assumed valid) //

$$(a + b)^2 = c^2 + 2ab \qquad (0003)$$

$$\textbf{Prove : } a^2 + b^2 = c^2 \qquad (0004)$$

View Source | View Symbols

{(2) {(2) a(2) }(2) raised(2) {(2) 2(2) }(2) }(2) plus(2) {(2) {(2) b(2) }(2) raised(2) {(2) 2(2) }(2) }(2) = { c } raised { 2 }

{(2) {(2) a(2) }(2) raised(2) {(2) 2(2) }(2) }(2) plus(2) {(2) 2ab(2) }(2) minus(2) {(2) 2ab(2) }(2) plus(2) {(2) b(2) raised(2) {(2) 2(2) }(2) }(2) = { c } raised { 2 }

{(0) {(0) a(0) }(0) raised(0) {(0) 2(0) }(0) }(0) plus(0) {(0) 2ab(0) }(0) minus { 2ab } plus(0) {(0) b(0) raised(0) {(0) 2(0) }(0) }(0) = { c } raised { 2 }

((0) {(0) a(0) }(0) plus(0) {(0) b(0) }(0))(0) raised(0) {(0) 2(0) }(0) minus { 2ab } = { c } raised { 2 }

((1) {(1) a(1) }(1) plus(1) {(1) b(1) }(1))(1) raised(1) {(1) 2(1) }(1) minus(1) {(1) 2ab(1) }(1) =(1) {(1) c(1) }(1) raised(1) {(1) 2(1) }(1)

((1) {(1) a(1) }(1) plus(1) {(1) b(1) }(1))(1) raised(1) {(1) 2(1) }(1) =(1) {(1) {(1) c(1) }(1) raised(1) {(1) 2(1) }(1) }(1) plus(1) {(1) 2ab(1) }(1)

((3) {(3) a(3) }(3) plus(3) {(3) b(3) }(3))(3) raised(3) {(3) 2(3) }(3) = { { c } raised { 2 } } plus { 2ab }

{(3) {(3) c(3) }(3) raised(3) {(3) 2(3) }(3) }(3) plus(3) {(3) 2ab(3) }(3) = { { c } raised { 2 } } plus { 2ab }

{ { c } raised { 2 } } plus { 2ab } = { { c } raised { 2 } } plus { 2ab }

Q.E.D. (via Auto)