Prove that sum of the legs of a right triangle never exceeds $\sqrt{2}$ times the hypotenuse.

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Discussion.

Let θ be the angle between the hypotenuse and the side adjacent to the hypotenuse. If the length of hypotenuse is l, the length of the adjacent side is b and the length of the opposite side is a, then

$$a + b = l(\sin(\theta) + \cos(\theta))$$

Therefore

$$a + b = l\sqrt{2}\sin(\theta + \pi/4)$$

Since $\sin(\theta + \pi/4) \leq 1$, the desired result follows.