

## Problem for 2012 August

Proposed by Dan Jurca

Prove that for each positive integer  $k$  there exist positive integers  $a$  and  $b$  such that

$$a^2 + b^2 = (b + k)^2.$$

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Solution by the proposer

For each positive integer  $k$  if  $a = 3k$  and  $b = 4k$ , then  $a$  and  $b$  are positive integers, and

$$\begin{aligned} a^2 + b^2 &= (3k)^2 + (4k)^2 \\ &= 9k^2 + 16k^2 \\ &= 25k^2 \\ &= (5k)^2 \\ &= (4k + k)^2 \\ &= (b + k)^2. \end{aligned}$$

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Also solved by Massoud Malek