

# Problem for 1999 November

Communicated by Dan Jurca

In the right triangle sketched above the altitude perpendicular to the hypotenuse has length  $h$ . Express the length of the hypotenuse  $c$  as a function of the perimeter (and  $h$ ).

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Solution by Dan Jurca

The perimeter  $P=a+b+c$ ; hence  $a+b=P-c$ . From the relation  $ab=ch$  we have

$$\begin{aligned}c^2 &= a^2 + b^2 \\ &= (a+b)^2 - 2ab \\ &= (P-c)^2 - 2ch \\ &= P^2 - 2Pc + c^2 - 2ch\end{aligned}$$

$$\text{so } (2P+2h)c = P^2$$

$$\text{and finally } c = \frac{P^2}{2(P+h)}.$$