1076. *Proposed by Peter A. Lindstrom, Batavia, NY.*
Consider the right triangle ABC, where $|AB| = x$, $|BC| = y$ so that $|AC| = \sqrt{x^2 + y^2}$. Consider another right triangle $A'B'C'$ which is congruent to ABC, where $A = A'$ and B' is a point on AC. Extend BC and $A'C'$ so that they intersect at D. Let $|CD| = a$ and $|C'D| = b$. Express a and b in terms of x and y.

Solution by **Rex H. Wu**, *Brooklyn, NY.*
From the double angle formulae, we have

$$\begin{aligned}
\tan 2A &= \frac{2\tan A}{1 - \tan^2 A} \\
\frac{a+y}{x} &= \frac{\frac{2y}{x}}{1 - \frac{y^2}{x^2}} \\
\frac{a+y}{x} &= \frac{2xy}{x^2 - y^2} \\
a &= \frac{y(x^2+y^2)}{x^2 - y^2}
\end{aligned}$$

$$\begin{aligned}
\sin 2A &= 2\sin A \cos A \\
\frac{a+y}{b + \sqrt{x^2+y^2}} &= 2\frac{y}{\sqrt{x^2+y^2}}\frac{x}{\sqrt{x^2+y^2}} \\
\frac{\frac{y(x^2+y^2)}{x^2-y^2} + y}{b + \sqrt{x^2+y^2}} &= \frac{2xy}{x^2+y^2} \\
\frac{\frac{2x^2y}{x^2-y^2}}{b + \sqrt{x^2+y^2}} &= \frac{2xy}{x^2+y^2} \\
\frac{\frac{x}{x^2-y^2}}{b + \sqrt{x^2+y^2}} &= \frac{1}{x^2+y^2} \\
b &= \frac{x(x^2+y^2)}{x^2-y^2} - \sqrt{x^2+y^2}
\end{aligned}$$

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