find q if x = ( sec q + tan q) and y = b( sec q - tan q)

**Solution**

Multiply x by y:

$$xy = b(\sec q + \tan q)(\sec q - \tan q) = b(\sec q^2 - \tan q^2) = b\left(\frac{1}{\cos q^2} - \tan q^2\right)$$
$$= \left|\frac{1}{\cos q^2} = 1 + \tan q^2\right| = b * 1 = b \rightarrow b = xy$$

$$x = (\sec q + \tan q) = \frac{1}{\cos q} + \frac{\sin q}{\cos q} = \frac{1 + \sin q}{\cos q}$$

Let's use $\begin{cases} \cos\left(\frac{\pi}{2} - q\right) = \sin q \\ \sin\left(\frac{\pi}{2} - q\right) = \cos q \end{cases}$. Then

$$x = \frac{1 + \sin q}{\cos q} = \frac{1 + \cos\left(\frac{\pi}{2} - q\right)}{\sin\left(\frac{\pi}{2} - q\right)} = \cot\frac{\left(\frac{\pi}{2} - q\right)}{2}, \textit{because of} \ \cot\frac{q}{2} = \frac{1 + \cos q}{\sin q}$$

So

$x = \cot\left(\frac{\pi}{4} - \frac{q}{2}\right) \rightarrow \left(\frac{\pi}{4} - \frac{q}{2}\right) = \cot^{-1} x \rightarrow q = 2\left(\frac{\pi}{4} - \cot^{-1} x\right) = \frac{\pi}{2} - 2\cot^{-1} x$ .

**Answer:** $\boldsymbol{\frac{\pi}{2} - 2\cot^{-1} x}$ .