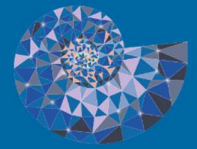


Trigonometric identities



Gold

Show that:

$$(\cos x + \tan x \sin x)^2 \equiv \sec^2 x.$$

Hence explain why $\cos x + \tan x \sin x = \frac{1}{2}$ has no solutions.

Silver

Solve the equation:

$$\sec \theta \cot \theta = 2$$

for $0 \leq \theta \leq 2\pi$.

Bronze

Simplify fully:

$$\frac{1}{\cot \theta} \cos^2 \theta \operatorname{cosec} \theta.$$