Trigonometry Review

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(a) $\cot x \cdot \sec x \cdot \sin x = 1$

$\frac{\cos x}{\sin x} \cdot \frac{1}{\cos x} \cdot \sin x = 1$ (copy over) indeed ✓

Note to myself: $\cos x \neq 0$, $\sin x \neq 0$.

(b) $\cos t \cot t = \frac{1 - \sin^2 t}{\sin t}$

Let's work on the right side:

$\frac{1 - \sin^2 t}{\sin t} = \frac{\cos^2 t}{\sin t}$ = look at the left side: $\cos t \cdot \cot t$ — we got one $\cos t$ and $\cot t = \frac{\cos t}{\sin t}$

using $\cos^2 t + \sin^2 t = 1$: $\cos^2 t = 1 - \sin^2 t$

$= \cos t \cdot \frac{\cos t}{\sin t} = \cos t \cdot \cot t$ — we got the left side

✓

(c) $\cos\left(x + \frac{\pi}{2}\right) = \sin x$

Let's begin with the left side:

$\cos\left(x + \frac{\pi}{2}\right) = \cos x \cos\frac{\pi}{2} - \sin x \sin\frac{\pi}{2} =$

using formula $\cos(\alpha + \beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta$

from the table: $\cos\frac{\pi}{2} = 0$, $\sin\frac{\pi}{2} = 1$

$= \cos x \cdot 0 - \sin x \cdot 1 = -\sin x$ — we got the right side!

✓