* Pyth. Id's

✓ $\cos^2\theta + \sin^2\theta = 1$

* $\sin^2\theta = 1 - \cos^2\theta$
* $\cos^2\theta = 1 - \sin^2\theta$

✓ $1 + \tan^2\theta = \sec^2\theta$

* $\tan^2\theta = \sec^2\theta - 1$

$\cot^2\theta + 1 = \csc^2\theta$

* $\cot^2\theta = \csc^2\theta - 1$

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Verifying:

- look for pyth. ids
- rewrite in terms of sin/cos
- common math (etc... +/−, fractions
- algebra (etc... foil, factor, distribute

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① $\tan x = \dfrac{\cos x}{\sin x \cot^2 x}$

$= \dfrac{\frac{\cos x}{1}}{\sin x \cdot \frac{\cos^2 x}{\sin^2 x}}$ · $\frac{\sin x}{\cos x}$

$= \cancel{\cos x} \cdot \dfrac{\sin x}{\cos^2 x}$

$\tan x = \tan x$

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② $\dfrac{1}{\sec^2\theta} + \dfrac{1}{\csc^2\theta} = 1$

$\cos^2\theta + \sin^2\theta =$

$1 = 1$

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③ $\dfrac{\sin x}{\csc x} + \dfrac{\cos x}{\sec x} = 1$

$\dfrac{\sin x}{\frac{1}{\sin x}} + \dfrac{\cos x}{\frac{1}{\cos x}} =$

$\sin^2 x + \cos^2 x =$

$1 = 1$

$\sin x \cdot \dfrac{\sin x}{1} + \cos x \cdot \dfrac{\cos x}{1}$

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$\dfrac{(1 + \tan^2 x)}{\csc^2 x} = \tan^2 x$

$\dfrac{\sec^2 x}{\csc^2 x} =$

$\dfrac{\frac{1}{\cos^2 x}}{\frac{1}{\sin^2 x}} =$

$\dfrac{1}{\cos^2 x} \cdot \dfrac{\sin^2 x}{1}$

$\dfrac{\sin^2 x}{\cos^2 x}$

$\tan^2 x = \tan^2 x$

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$\cos^2 x + \tan^2 x \cos^2 x = 1$

$\cos^2 x + \sin^2 x \cdot \frac{\cos^2 x}{\cos^2 x} =$

$\cos^2 x + \sin^2 x =$

$1 =$

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$\frac{\sin\theta}{1-\cos^2\theta} = \csc\theta$

$\sin^2 x + \cos^2 x = 1$

$\sin^2 x = 1 - \cos^2 x$

$\frac{1}{\frac{\sin x}{\sin^2 x}}$

$\frac{1}{\frac{\sin x}{\csc x}}$

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$\frac{\cot\theta}{1+\cot^2\theta} = \cos\theta\sin\theta$

$\frac{\cot\theta}{\csc^2\theta}$

$\frac{\frac{\cos\theta}{\sin\theta}}{\frac{1}{\sin^2\theta}} = \frac{\cos\theta}{\sin\theta} \cdot \frac{\sin^2\theta}{1}$

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(14)

$\frac{\cot\theta}{\sec\theta} = \frac{\frac{1}{\sin\theta}}{\frac{1}{-\sin\theta}} \cdot \frac{\sin\theta}{\sin\theta}$

$= \frac{1-\sin^2\theta}{\sin\theta}$

$= \frac{\cos^2\theta}{\sin\theta}$

$= \frac{\cos\theta \cdot \cos\theta}{\sin\theta}$

$= \cot\theta \cdot \frac{1}{\sec\theta}$

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