5-8-14
3rd Trig

Simplify

① $\tan x \cdot \csc x \cdot \cos x$

$\frac{\sin x}{\cos x} \cdot \frac{1}{\sin x} \cdot \frac{\cos x}{1} = \frac{1}{1} = 1$

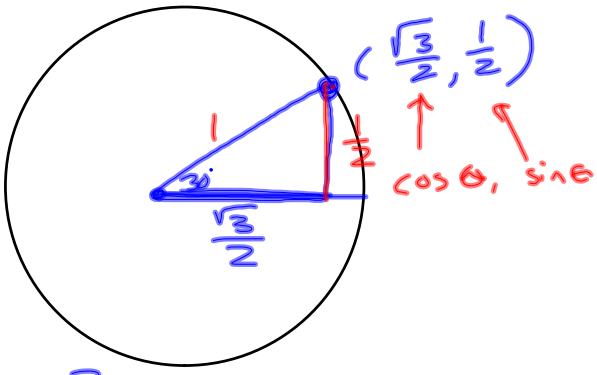
② $\dfrac{\tan x \cdot \csc x}{\sec x}$

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

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

OR

$\frac{1}{\cos x} \cdot \frac{\cos x}{1} = 1$



$\left(\frac{\sqrt{3}}{2}\right)^2 + \left(\frac{1}{2}\right)^2 = 1^2$

$\frac{3}{4} + \frac{1}{4} = 1 \checkmark$

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

$$\cos^2\theta + \sin^2\theta = 1$$
$$-\sin^2\theta \quad -\sin^2\theta$$

① $\cos^2\theta = 1 - \sin^2\theta$

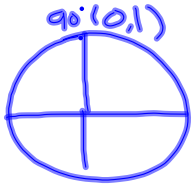
② $\sin^2\theta = 1 - \cos^2\theta$

$1 - \sin^2\theta = (1 - \sin\theta)(1 + \sin\theta)$

$1 - \cos^2\theta = (1 - \cos\theta)(1 + \cos\theta)$

$\cos(90° - \theta)$

$= \cos 90° \cdot \cos\theta + \sin 90° \cdot \sin\theta$



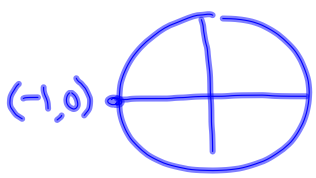
$= 0 \cdot \cos\theta + 1 \cdot \sin\theta$

$= 0 + \sin\theta$

$= \sin\theta$

$\cos(\theta + 180°)$

$= \cos\theta \cdot \cos 180° - \sin\theta \cdot \sin 180°$



$= \cos\theta \cdot -1 - \sin\theta \cdot 0$

$-\cos\theta - 0$

$= -\cos\theta$

$$\frac{\tan^2 X}{\sec^2 X}$$

$$= \frac{\dfrac{\sin^2 X}{\cos^2 X}}{\dfrac{1}{\cos^2 X}} = \frac{\sin^2 X}{\cancel{\cos^2 X}} \cdot \frac{\cancel{\cos^2 X}}{1}$$

$$= \sin^2 X$$

5-8-14
4th Trig

① $\tan x \cdot \csc x \cdot \cos x$

$\downarrow$

$\frac{\sin x}{\cos x} \cdot \frac{1}{\sin x} \cdot \frac{\cos x}{1} = \frac{1}{1} = 1$

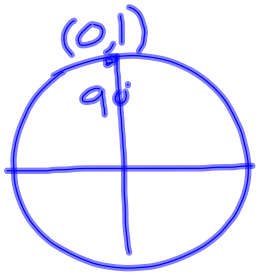
② $\dfrac{\tan x \cdot \csc x}{\sec x}$

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

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

③ $\cos(90^\circ - \theta)$

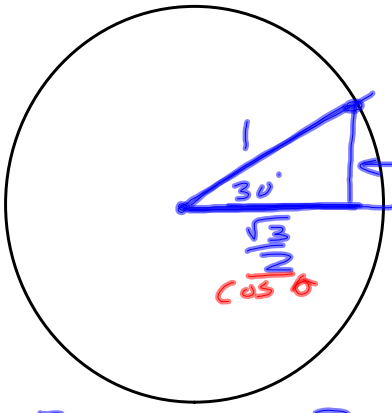
$= \cos 90^\circ \cdot \cos\theta + \sin 90^\circ \cdot \sin\theta$



$= 0 \cdot \cos\theta + 1 \cdot \sin\theta$

$= 0 + \sin\theta$

$= \sin\theta$



$$\left(\frac{\sqrt{3}}{2}\right)^2 + \left(\frac{1}{2}\right)^2 = 1^2$$

$$\frac{3}{4} + \frac{1}{4} = 1$$

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

$$\downarrow$$

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

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

$$1 - \sin^2\theta = (1 + \sin\theta)(1 - \sin\theta)$$

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

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

$$\frac{(1 + \sin\theta)\cancel{(1 - \sin\theta)}}{\cancel{1 - \sin\theta}}$$

$$1 + \sin\theta$$

$$\frac{\cos\theta}{\sin\theta \cdot \cot^2\theta}$$

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

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

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

$$\tan\theta$$