

6.1 Pythagorean Identities

$$a^2 + b^2 = c^2$$

$$x^2 + y^2 = r^2$$

$$\boxed{\cos^2 x + \sin^2 x = 1}$$

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

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

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

$$\boxed{1 + \tan^2 x = \sec^2 x}$$

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

$$\boxed{\cot^2 x + 1 = \csc^2 x}$$

10. $\frac{\csc x}{\tan x + \cot x}$

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

$$\frac{\cancel{\sin x} \cdot \frac{\sin x}{\cos x} + \frac{\cos x}{\cancel{\sin x}} \cdot \frac{\cancel{\cos x}}{\cos x}}{\sin x + \cos x}$$

$$\frac{\frac{1}{\sin x}}{\frac{\sin^2 x + \cos^2 x}{\sin x \cdot \cos x}}$$

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

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