

Definitions:

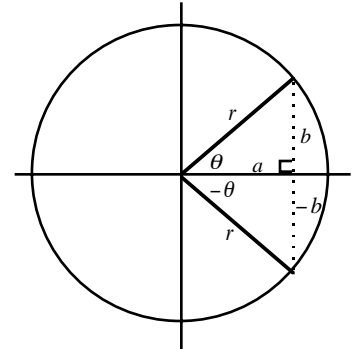
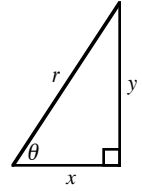
$$\sin \theta = \frac{y}{r} \quad \cos \theta = \frac{x}{r} \quad \tan \theta = \frac{y}{x} \quad \cot \theta = \frac{x}{y} \quad \csc \theta = \frac{r}{y} \quad \sec \theta = \frac{r}{x}$$

Reciprocal identities:

$$\csc \theta = \frac{1}{\sin \theta}, \quad \sec \theta = \frac{1}{\cos \theta}, \quad \cot \theta = \frac{1}{\tan \theta}$$

Negative angle identities:

$$\sin(-\theta) = -\sin \theta, \quad \cos(-\theta) = \cos \theta, \quad \tan(-\theta) = -\tan \theta$$



Identities:

$$1) \tan x = \frac{\sin x}{\cos x} \rightarrow \cot x = \frac{\cos x}{\sin x}$$

$$2) \sin^2 x + \cos^2 x = 1 \rightarrow \tan^2 x + 1 = \sec^2 x, \quad 1 + \cot^2 x = \csc^2 x$$

TO DO

- Start with more complex side (more to work with)
- Always look for forms of known identities that you can apply (e.g. $1 - \sin^2 x = \cos^2 x$)
- Multiply denominators according to table below:

Denominator	Multiply by
$1 \pm \sin x$	$\frac{1 \mp \sin x}{1 \mp \sin x}$
$1 \pm \cos x$	$\frac{1 \mp \cos x}{1 \mp \cos x}$
$\sec x \pm \tan x$	$\frac{\sec x \mp \tan x}{\sec x \mp \tan x}$
$\sec x \pm 1$	$\frac{\sec x \mp 1}{\sec x \mp 1}$
$\csc x \pm \cot x$	$\frac{\csc x \mp \cot x}{\csc x \mp \cot x}$
$\csc x \pm 1$	$\frac{\csc x \mp 1}{\csc x \mp 1}$

- Multiply denominators of by
- Convert $\tan x, \cot x, \csc x, \sec x \rightarrow \sin x, \cos x$ expressions then algebra, typically clearing fractions.

Multiply by conjugate *only* if it gets you a form equivalent to one of the Pythag. identities.
Otherwise convert to $\sin x, \cos x$.