

**"The Good Sheet"**  
(Trig Formulas that I must know!!)

*Law of Sines*

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

*Law of Cosines*

$$\begin{aligned} a^2 &= b^2 + c^2 - 2bc \cos A & \cos A &= \frac{b^2 + c^2 - a^2}{2bc} \\ b^2 &= a^2 + c^2 - 2ac \cos B & \cos B &= \frac{a^2 + c^2 - b^2}{2ac} \\ c^2 &= a^2 + b^2 - 2ab \cos C & \cos C &= \frac{a^2 + b^2 - c^2}{2ab} \end{aligned}$$

*Reciprocal Identities*

$$\begin{aligned} \sin x &= \frac{1}{\csc x} & \sec x &= \frac{1}{\cos x} & \tan x &= \frac{1}{\cot x} \\ \csc x &= \frac{1}{\sin x} & \cos x &= \frac{1}{\sec x} & \cot x &= \frac{1}{\tan x} \end{aligned}$$

*Tangent and Cotangent Identities*

$$\tan x = \frac{\sin x}{\cos x} \quad \cot x = \frac{\cos x}{\sin x}$$

*Pythagorean Identities*

$$\begin{aligned} \sin^2 \theta + \cos^2 \theta &= 1 \\ 1 + \tan^2 \theta &= \sec^2 \theta \\ 1 + \cot^2 \theta &= \csc^2 \theta \end{aligned}$$

*Negative Angle Identities*

$$\begin{aligned} \sin(-x) &= -\sin x & \cos(-x) &= \cos x & \tan(-x) &= -\tan x \\ \csc(-x) &= -\csc x & \sec(-x) &= \sec x & \cot(-x) &= -\cot(x) \end{aligned}$$

*Cofunction Identities*

$$\begin{aligned} \sin\left(\frac{\pi}{2} - x\right) &= \cos x & \tan\left(\frac{\pi}{2} - x\right) &= \cot x & \sec\left(\frac{\pi}{2} - x\right) &= \csc x \\ \cos\left(\frac{\pi}{2} - x\right) &= \sin x & \cot\left(\frac{\pi}{2} - x\right) &= \tan x & \csc\left(\frac{\pi}{2} - x\right) &= \sec x \end{aligned}$$

*Sum and Difference Formulas*

$$\begin{aligned} \sin(u \pm v) &= \sin u \cos v \pm \cos u \sin v & \tan(u \pm v) &= \frac{\tan u \pm \tan v}{1 \mp \tan u \tan v} \\ \cos(u \pm v) &= \cos u \cos v \mp \sin u \sin v \end{aligned}$$

*Double Angle Formulas*

$$\begin{aligned} \sin 2u &= 2 \sin u \cos u & \tan 2u &= \frac{2 \tan u}{1 - \tan^2 u} \\ \cos 2u &= \cos^2 u - \sin^2 u = 2 \cos^2 u - 1 = 1 - 2 \sin^2 u \end{aligned}$$

*Half-Angle Formulas*

$$\begin{aligned} \sin \frac{u}{2} &= \pm \sqrt{\frac{1 - \cos u}{2}} & \cos \frac{u}{2} &= \pm \sqrt{\frac{1 + \cos u}{2}} & \tan \frac{u}{2} &= \frac{1 - \cos u}{\sin u} = \frac{\sin u}{1 + \cos u} \end{aligned}$$

*Power-Reducing Formulas*

$$\begin{aligned} \sin^2 u &= \frac{1 - \cos 2u}{2} & \cos^2 u &= \frac{1 + \cos 2u}{2} & \tan^2 u &= \frac{1 - \cos 2u}{1 + \cos 2u} \end{aligned}$$