MTH 7 Trigonometry Formula Sheet

Sum and Difference Formulas

$$\sin(u+v) = \sin(u)\cos(v) + \cos(u)\sin(v) \qquad \cos(u+v) = \cos(u)\cos(v) - \sin(u)\sin(v)$$

$$\sin(u-v) = \sin(u)\cos(v) - \cos(u)\sin(v) \qquad \cos(u-v) = \cos(u)\cos(v) + \sin(u)\sin(v)$$

$$\tan(u+v) = \frac{\tan(u)+\tan(v)}{1-\tan(u)\tan(v)} \qquad \tan(u-v) = \frac{\tan(u)-\tan(v)}{1+\tan(u)\tan(v)}$$

Double Angle Formulas

$$\sin(2u) = 2\sin(u)\cos(u) \qquad \tan(2u) = \frac{2\tan(u)}{1-\tan^2(u)}$$

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

Half Angle Formulas

$$\sin\left(\frac{u}{2}\right) = \pm\sqrt{\frac{1-\cos(u)}{2}} \qquad \cos\left(\frac{u}{2}\right) = \pm\sqrt{\frac{1+\cos(u)}{2}}$$

$$\tan\left(\frac{u}{2}\right) = \frac{1-\cos(u)}{\sin(u)} = \frac{\sin(u)}{1+\cos(u)}$$

Power Reducing Formulas

$$\sin^2 u = \frac{1-\cos 2u}{2} \qquad \cos^2 u = \frac{1+\cos 2u}{2}$$

Polar Coordinate Conversions

$$x = r\cos\theta$$
$$y = r\sin\theta$$
$$x^2 + y^2 = r^2$$

Law of Sines:

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

Law of Cosines:

$$c^2 = a^2 + b^2 - 2ab\cos(C)$$