

Math 104 Additional Formulas

Half-Angle Identities:

$$1. \cos \frac{A}{2} = \pm \sqrt{\frac{1 + \cos A}{2}}$$

$$2. \sin \frac{A}{2} = \pm \sqrt{\frac{1 - \cos A}{2}}$$

$$3. \tan \frac{A}{2} = \pm \sqrt{\frac{1 - \cos A}{1 + \cos A}} = \frac{\sin A}{1 + \cos A} = \frac{1 - \cos A}{\sin A}$$

Law of Sines:

In any triangle ABC with sides a, b, and c:

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

Area of a Triangle:

In any triangle ABC with sides a, b, and c, the area is given by:

$$\text{Area} = \frac{1}{2}bc \sin A = \frac{1}{2}ab \sin C = \frac{1}{2}ac \sin B$$

Law of Cosines:

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$b^2 = a^2 + c^2 - 2ac \cos B$$

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