

Math 131 Unit 3 Formula sheet

For Triangles ABC with sides a, b, c

The Law of Sines

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

The Law of Cosines

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

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

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

Area

$$Area = \frac{1}{2} bc \sin A$$

$$Area = \frac{1}{2} ac \sin B$$

$$Area = \frac{1}{2} ab \sin C$$

Heron's Formula

Let $s = \frac{a+b+c}{2}$ be the semiperimeter.

$$Area = \sqrt{s(s-a)(s-b)(s-c)}$$

Unit Vector

$$\vec{u} = \frac{\vec{v}}{\|\vec{v}\|}$$

Find a Vector from its Direction and Magnitude

$$\vec{v} = \|\vec{v}\| (\cos \alpha \vec{i} + \sin \alpha \vec{j})$$

Angle between Vectors

The angle, $0 \leq \theta \leq \pi$, between two vectors $\vec{u}$ and $\vec{v}$ is given by

$$\cos \theta = \frac{\vec{u} \cdot \vec{v}}{\|\vec{u}\| \|\vec{v}\|}$$