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

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

Find a Vector from its Direction and Magnitude

$$v = \|v\| \left(\cos\alpha\, i + \sin\alpha\, j \right)$$

Angle between Vectors

The angle, $0 \le \theta \le \pi$, between two vectors u and v is given by

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