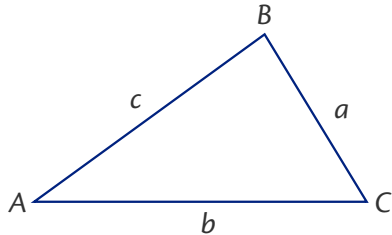


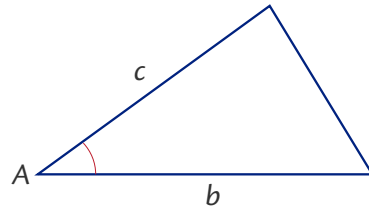
Sines

Law of Sines



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

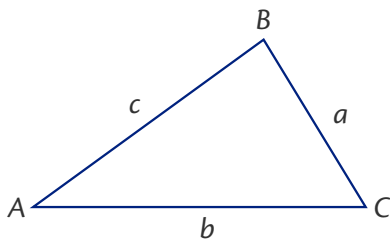
Area of an Arbitrary Triangle



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

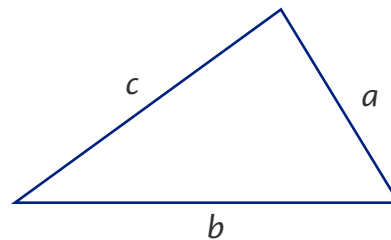
Cosines

Law of Cosines



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

Heron's Area Formula



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

$$\text{where } s = \frac{1}{2}(a + b + c)$$

Trigonometric Form of Complex Numbers

Standard form: $z = a + bi$

$$a = r \cos \theta$$

$$b = r \sin \theta$$

Trigonometric form: $z = r(\cos \theta + i \sin \theta)$

$$r = \sqrt{a^2 + b^2}$$

$$\theta = \tan^{-1} b/a$$

Absolute value, $|z| = \sqrt{a^2 + b^2}$ (yes, this is the same as r , above)

Multiplying and Dividing

$$z_1 z_2 = r_1 r_2 [\cos(\theta_1 + \theta_2) + i \sin(\theta_1 + \theta_2)]$$

$$\frac{z_1}{z_2} = \frac{r_1}{r_2} [\cos(\theta_1 - \theta_2) + i \sin(\theta_1 - \theta_2)] \quad z_2 \neq 0$$

Powers and Roots

$$z^n = r^n (\cos n\theta + i \sin n\theta)$$

$$\sqrt[n]{z} = \sqrt[n]{r} \left(\cos \frac{\theta + 2\pi k}{n} + i \sin \frac{\theta + 2\pi k}{n} \right) \quad k = 0, 1, 2, \dots, n-1$$