Trigonometry

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Contents

1 Law of sines

Given a triangle with sides a, b and c and their respective opposite angles α, β and γ

$$\frac{\sin(\alpha)}{a} = \frac{\sin(\beta)}{b} = \frac{\sin(\gamma)}{c}$$

2 Law of cosines

Given a triangle with sides a, b and c

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

where γ is the angle between a and b (opposite of c).

3 Pythagorean identities

An arbitrary angle θ on the unit circle forms a triangle with sides 1, $\sin\theta$ and $\cos\theta$. Give the Pythagorean theorem we have

$$\sin^2\theta + \cos^2\theta = 1$$

which implies

$$\sin\theta = \pm\sqrt{1 - \cos^2\theta}$$
$$\cos\theta = \pm\sqrt{1 - \sin^2\theta}$$