

Formulas for Programming

Law of Sines

Law of Cosines

Area of Triangle = $\frac{1}{2} bh$

Area of Triangle $\frac{1}{2}$ side side $\sin \theta$

Dot product of 2 vectors

Cross product of 2 vectors

Angle between 2 vectors

Pythagorean Theorem

Hero's Formula $a = \sqrt{s(s-a)(s-b)(s-c)}$

Quadratic Formula

Motion in 1D Equations:

$$v=d/t$$

$$a=\Delta v/t=(v_2-v_1)/t$$

$$d=vt+d_i$$

$$v_f=at+v_i$$

$$d=\frac{1}{2}at^2+v_it+d_i$$

$$v_f^2=2ad+v_i^2$$

Motion in 2D Equations:

Horizontal Projectiles

$$[t=\sqrt{(2d_y)/g}]$$

$$[d_y=v_x t]$$

Range

$$[d_y=\frac{1}{2}at^2]$$

Height

Projectiles at Angles

$$R=(v_0^2 \sin 2\theta)/g$$

$$H=(v_0 \sin \theta)^2/2g$$

Projectiles at \angle s launched from a height

$$[d_t=v_0 \cos \theta t]$$

$$D_y=-\frac{1}{2}gt^2+(v_0 \sin \theta)t+d_{yi}$$