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MOTION IN A PLANE

III. Law of Cosines. If θ is the angle between $\vec{F}$ and $\vec{C}$ then $R = \sqrt{F^2 + C^2 - 2FC \cos \theta}$

Here, θ = angle between $\vec{F}$ and $\vec{C}$

1211. Direction of $R = \tan^{-1} \frac{C \sin \theta}{F - C \cos \theta}$ = angle between $\vec{O}$ and $\vec{P}$

II. Position of an object at time t , if it is initially at position $\vec{r}_0$ with initial velocity $\vec{v}_0$ and moving with constant acceleration $\vec{a}$, is

$$\vec{r} = \vec{r}_0 + \vec{v}_0 t + \frac{1}{2} \vec{a} t^2$$