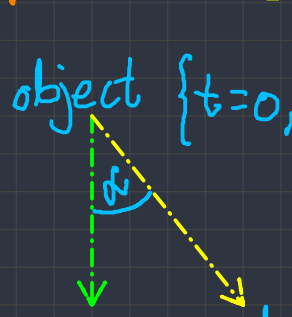
Work done:

The work done is equal to the product of the force and the distance travelled in the same direction of the force.

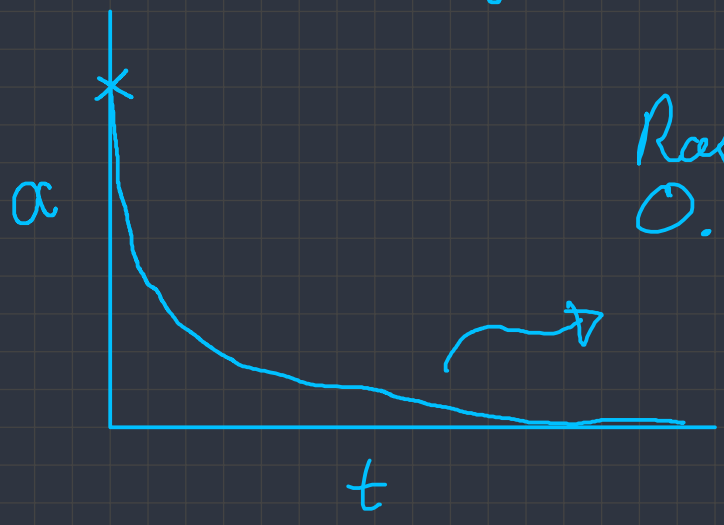
Work done = force × distance in direction of force

$W = F \times s \times \cos(\alpha)$

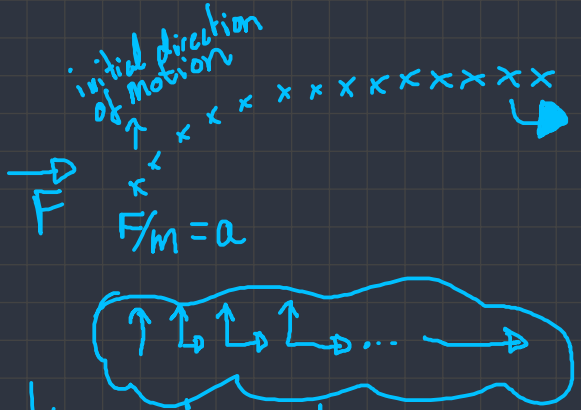
where α is the angle between the direction of force and the direction of motion.



object $\{t=t, ke = \int_0^t$



Rate of decrease of α approaches 0.



α approaches zero as direction of motion approaches the direction of force (as speed in direction of force increases)

$$V_f = u_f + a_f t = u_f + \frac{F}{m} t$$

$$a = \frac{F}{m}$$

as t increases, force in direction of motion increases, so as t approaches ∞ direction of motion approaches direction of force

$$\arctan\left(\frac{u_y + a_y t}{u_x + a_x t}\right) = \alpha$$

$$\int_0^t \left(F \times s \times \cos\left(\arctan\left(\frac{u_y + a_y t}{u_x + a_x t}\right)\right)\right) dt$$