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02 Acceleration

The "SUVAT" equations

Acceleration is the rate of change of velocity of an object.

$$a=rac{v-u}{t}$$

Where \boldsymbol{a} is acceleration, \boldsymbol{v} is the final velocity, \boldsymbol{u} is the initial velocity and \boldsymbol{t} is the time elapsed.

This equation can be rearranged to give:

$$v = u + at$$

If **S** represents displacement of an object then:

$$s = \frac{1}{2}(u + u)esale.CO.Un$$

$$from from 14$$

$$page t + \frac{1}{2}at^{2}$$

$$v^{2} = u^{2} + 2as$$

These equations are true if the acceleration of the body in question is constant (i.e. it doesn't change over the time interval). The units used must be consistent, the standard units are:

- Acceleration: ms⁻² (or m/s²)
- Velocity: ms⁻¹ (or m/s¹)
- Displacement: m
- Time: s

06 Moments

The moment of a force about a point is found by multiplying the magnitude of the force by the perpendicular distance from the point to the line of action of the force.



The moment of the force $m{F}$ about point $m{A}$ is fixed.



In any direction the resultant force is zero but the moment about A is clearly not zero, such forces acting on a body might cause the body to rotate, but not move in any direction.

If a system is in equilibrium, the system will have zero resultant force and the sum of the moments about any point will be zero.