

pendulum, mass
the relationship

$$(b) V \propto F^x M^y L^z$$

$$V = K F^x M^y L^z$$

$$L T^{-1} = K (M L T^{-2})^x (M)^y L^z$$

$$L T^{-1} = K M^x L^x T^{-2x} M^y L^z$$

$$L T^{-1} = K M^{x+y} L^{x+z} T^{-2x}$$

Equating the indices on both sides

$$L: 1 = x + z \quad (i)$$

$$M: 0 = x + y \quad (ii)$$

$$T: -1 = -2x \quad (iii)$$

$$x = \frac{1}{2}$$

Put $x = \frac{1}{2}$ into equation (i)

$$1 = x + z$$

$$1 = x + \frac{1}{2}$$

$$1 - \frac{1}{2} = x$$

$$x = \frac{1}{2}$$

Put $x = \frac{1}{2}$ into equation (ii)

$$0 = x + y$$

$$0 = \frac{1}{2} + y$$

$$y = -\frac{1}{2}$$

$$V = K F^{\frac{1}{2}} M^{-\frac{1}{2}} L^z$$

$$V = K F^{\frac{1}{2}} M^{-\frac{1}{2}} L^{\frac{1}{2}}$$

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$$V = K \sqrt{\frac{FL}{M}}$$

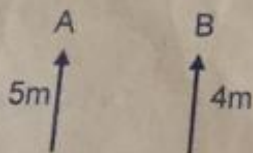
VECTOR ANALYSIS

Scalar quantities: are quantities that have magnitude but no direction e.g. distance, mass, speed, pressure, electric potential, heat capacity, altitude, work energy and power.

Vector quantities: are quantities that have magnitude as well as direction e.g. displacement, velocity, acceleration, weight, force, tension, impulse, momentum, magnetic induction, electric field intensity and torque.

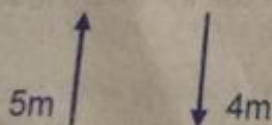
Vector Addition

- (1) When two vector move in the same direction, to get the resultant, you add both vectors e.g.



$$R = A + B = 5 + 4 = 9m.$$

- (2) When two vectors move in opposite direction, you subtract



$$R = A - B$$

$$R = 5 - 4 = 1m.$$

- (3) Geometrical methods: When two vectors make an angle with each other, calculate magnitude by using cosine rule and direction θ by using sine rule.