



SUVAT 1



Part A

Rearrange the equation of motion $v = u + at$, where v is the speed of a particle which has been accelerating at a constant rate a for a time t from an initial speed u , to make t the subject.

The following symbols may be useful: a , s , t , u , v

Part B

Again rearrange the equation of motion $v = u + at$, this time to make a the subject.

The following symbols may be useful: a , s , t , u , v

Part C

In the equation of motion for a uniformly accelerating body the distance s travelled in time t is given by $s = \frac{1}{2}(u + v)t$, where u and v are the initial and final speeds. Rearrange the equation to make u the subject.

The following symbols may be useful: a , s , t , u , v

Part D

Again looking at $s = \frac{1}{2}(u + v)t$, rearrange the equation to make t the subject.

The following symbols may be useful: a , s , t , u , v



SUVAT 2



Part A

In the equation of motion for a body accelerating uniformly at a rate a , the distance s travelled in time t is given by $s = ut + \frac{1}{2}at^2$, where u is its initial speed. Rearrange the equation to find expressions for t assuming $u = 0$.

☐

$$t = \sqrt{\frac{a}{2s}}$$

☐

$$t = \sqrt{\frac{2s}{a}}$$

☐

$$t = \frac{2s}{a}$$

☐

$$t = \sqrt{s - \frac{1}{2}a}$$

Part B

Rearrange the equation $s = ut + \frac{1}{2}at^2$ again, this time without assuming $u = 0$, to make t the subject.

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$$t = \frac{-u \pm \sqrt{u^2 + 2as}}{a}$$

☐

$$t = \sqrt{\frac{s}{u + \frac{1}{2}a}}$$

☐

$$t = \sqrt{s - u - \frac{1}{2}a}$$

☐

$$t = \frac{-u \pm \sqrt{u^2 - 2as}}{a}$$

Part C

In the equation of motion for a body accelerating uniformly at a rate a , the relationship between the distance travelled s and the initial and final speeds u and v is given by $v^2 = u^2 + 2as$. Rearrange the equation to find an expression for u .

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$$u = \frac{v}{\sqrt{2as}}$$

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

☐

$$u = v^2 - 2as$$

☐

$$u = \sqrt{v^2 - 2as}$$

Part D

Rearrange $v^2 = u^2 + 2as$ again, to make s the subject.

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$$s = v^2 - u^2 - 2a$$

☐

$$s = \sqrt{\frac{v^2 - u^2}{2a}}$$

☐

$$s = \frac{u^2 - v^2}{2a}$$

☐

$$s = \frac{v^2 - u^2}{2a}$$



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Quadratic Equations 2



Rearrange the equation $F = GMm/r^2$, the expression for the gravitational force F between two masses M and m a distance r apart, to make r the subject of the equation.

The following symbols may be useful: F , G , M , m , r

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Forces 1



Find the force, in newtons, on a body of mass 3.0 kg which is accelerating at 2.5 m s^{-2} .

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Quadratic Equations 1



Part A

Rearrange the equation $E_k = \frac{1}{2}mv^2$, which gives the kinetic energy E_k of a body of mass m travelling with speed v , to make v the subject of the equation.

The following symbols may be useful: E_k , P , R , V , m , v

Part B

Rearrange the equation $P = \frac{V^2}{R}$, which gives the power P dissipated in a resistance R when the voltage across it is V , to make V the subject of the equation.

The following symbols may be useful: E_k , P , R , V , m , v



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Kinematics 1



Using $v = u + at$, find v if $u = 3.0 \text{ m s}^{-1}$, $a = 9.8 \text{ m s}^{-2}$ and $t = 2.0 \text{ s}$.

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Kinematics 2



Using $v = u + at$, find v if $u = 3.0 \text{ cm s}^{-1}$, $a = 9.8 \text{ m s}^{-2}$ and $t = 2.0 \text{ ms}$.

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Trigonometric Functions



Part A

The equation $F = ILB \sin \theta$ gives the force F on a length L of wire carrying a current I in a magnetic field B , when the magnetic field is at an angle of θ to the direction of current flow. Rearrange the equation to find an expression for θ .

The following symbols may be useful: B , F , I , L , $\arcsin()$, θ

Part B

Rearrange the equation $x = A \cos(2\pi ft + \phi)$, which gives the displacement x of an object oscillating at a frequency f with an amplitude A , to make t the subject of the equation. Give the expression for t .

The following symbols may be useful: A , $\arccos()$, f , ϕ , π , t , x



Linear Equations 1



Part A

Rearrange the equation $F = ma$, which relates the force F on a body to its mass m and acceleration a , to make a the subject of the equation.

The following symbols may be useful: F , W , a , g , m

Part B

Rearrange the equation $W = mg$, which relates the weight W of a body to its mass m , to make m the subject of the equation.

The following symbols may be useful: F , W , a , g , m



Linear Equations 2



Part A

Rearrange the equation $\rho = \frac{m}{V}$, which relates the density ρ of a body to its mass m and volume V , to make m the subject of the equation.

The following symbols may be useful: I , R , V , m , ρ

Part B

Rearrange the equation $V = IR$, which relates the voltage V across a resistance R to the current I through it, to make I the subject of the equation.

The following symbols may be useful: I , R , V , m , ρ

Part C

Again considering the equation $V = IR$, make R the subject of the equation.

The following symbols may be useful: I , R , V , m , ρ