SUVAT 1

GCSE A Level

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

GCSE A Level

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.

- $t = \frac{-u \pm \sqrt{u^2 - 2as}}{a}$
- $t = \sqrt{\frac{s}{u + \frac{1}{2}a}}$
- $t = \frac{-u \pm \sqrt{u^2 + 2as}}{a}$
- $t = \sqrt{s - u - \frac{1}{2}a}$

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.

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

Part D

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

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

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Quadratic Equations 2

GCSE A Level

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

GCSE A Level

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

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Quadratic Equations 1

GCSE A Level

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

GCSE A Level

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

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Kinematics 2

GCSE A Level

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

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Trigonometric Functions

GCSE P P P A Level P P P

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(), theta`

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, phi, pi, t, x`

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Linear Equations 1

GCSE P P P A Level P P P

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`

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Linear Equations 2

GCSE A Level

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, rho`

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, rho`

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, rho`

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