# A Level Physics

**Rearranging formulae**

In each question there is a formula and an unfinished rearranged version. Complete these unfinished rearrangements, showing each step of your working.

1. $V=IR$

a) R =

b) I =

1. $ρ=\frac{RA}{l}$
a) l =

b) A =

1. $y=mx+c$

a) m =

b) c =

1. $nλ=dsinθ$
a) d =

b) n =

1. $V=\frac{4}{3}πr^{3}$
a)$π$=

b) r =

1. $gh=\frac{1}{2}v^{2}$
a) 2 =
b) v =
2. $s=ut+\frac{1}{2}at^{2}$
a) u =

b) a =

1. $T=2π\sqrt{\frac{l}{g}}$
a) l =
b) g =

**Further algebraic manipulation**

Substitute equation (i) into equation (ii) and simplify the result.

1. (i) $v=u+at$
(ii) $x=\frac{(u+v)}{2}t$
2. (i)$F=\frac{mv^{2}}{r}$
(ii) $F=\frac{GMm}{r^{2}}$
3. (i)$ω^{2}=\frac{k}{m}$
(ii) $T=\frac{2π}{ω}$
4. (i)$v=\sqrt{\frac{2GM}{R}}$
(ii) $M=\frac{4}{3}πR^{3}ρ$

**Standard form**

Write each number in standard form.

1. 45000
2. 364000000
3. 0.00238
4. 0.000000103000
5. 0.301

Express each of the following quantities in the most suitable unit. For example 41000 g would be rewritten as 41 kg.

1. 0.0000041 V
2. 6900000000 A
3. 6782000000 km
4. 0.000000000481 C
5. 0.009387 Sv
6. 893000000000000 Nm-2

**Order of magnitude estimation**

In each question clearly explain you reasoning and any assumptions that you make.

1. How many grapes could you fit in a single layer on a sheet of A4 paper?
2. How many metres of spaghetti have you eaten in your lifetime?
3. How many Year 7 children could you fit into this lab?
4. What is the smallest object you could physically store a million pounds in?
5. What is the volume of an average adult human being? How many times larger is this than the volume of an average newborn child?
6. What is the smallest number of bow ties that would be too heavy for you to lift?
7. How many left handed shop owners are there in Derby?