MS.5.1 How to lay out physics calculations - method 1

When answering calculation questions, it is important to lay out the calculation in a certain way to show how you arrive at the answer.

Consider the following worked example:

Worked example
Question: A runner runs at a speed of 1.5 m/s *for a time of* 1800 s. *What distance do they cover?*

$$speed = \frac{distance}{time}$$ ← **E**quation

$$\therefore distance = speed \times time$$ ← **R**earrange (if needed)

$$= 1.5 \times 1800$$ ← **I**nsert values

$$= \underline{2700\ m}$$ ← **C**alculate

← **A**dd unit

This symbol means 'therefore'

We can use the acronym ERICA to help with remembering the steps required.

1) Answer the following question, laying out your calculation in the same way as the example (above):

Question: A person stands on one foot. The area of their foot is $1.5 \times 10^{-3}\ m^2$. *What is their weight (force), if the pressure under the foot is 53 000 Pa?*

$$pressure = \frac{force}{area}$$ ← **E**quation

$$\therefore \_\_\_\_\_ = \_\_\_\_\_ \times \_\_\_\_\_$$ ← **R**earrange

$$= \_\_\_\_\_ \times \_\_\_\_\_$$ ← **I**nsert values

$$= \_\_\_\_\_$$ ← **C**alculate

← **A**dd unit

Please look at worksheet MS.2 if you need help with rearranging.

2) Answer the following question, laying out your calculation in the same way as the worked example (above):

Question: A car with a mass of 1200 kg is travelling at a velocity of 10 m/s. What momentum does it have? (momentum = mass × velocity)

E

R ← Note: this step is not needed

I

C

A

3) Answer the following question, laying out your calculation in the same way as the worked example (above):

Question: A current of 1.5 A flows through a resistor with a resistance of 200 Ω. What is the potential difference across the resistor?
(resistance = $\frac{potential\ difference}{current}$)

E

R

I

C

A

4) Answer the following question, laying out your calculation in the same way as the worked example (above):

Question: An electric cooker with a power rating of 3000 W is switched on. How long (time) is it switched on for if it transfers 540 000 J of energy?
(power = $\frac{energy}{time}$)