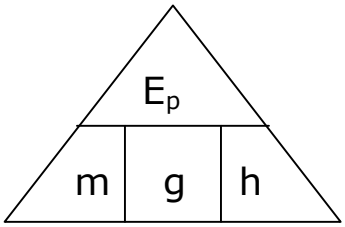
Examples of Potential Energy Problems

Study these sample problems and the methods used to solve them.

You might want to use this triangle to help you with questions involving **potential energy**.



Example:
A box has a mass of 5.8kg. The box is lifted from the garage floor and placed on a shelf. If the box gains 145J of Potential Energy (E_p), how high is the shelf?

Solution:
Use

$E_p = mgh$

E_p = potential energy (Joules)
m = mass of box (kg)
g = gravitational field strength (N/kg)
h = difference in height (m)

rearrange equation to find height

$$h = \frac{E_p}{mg} = \frac{145}{5.8x9.8} = 2.55$$

The shelf is 2.55m high

Example:
A man climbs on to a wall that is 3.6m high and gains 2268J of potential energy. What is the mass of the man?

Solution:
Use:

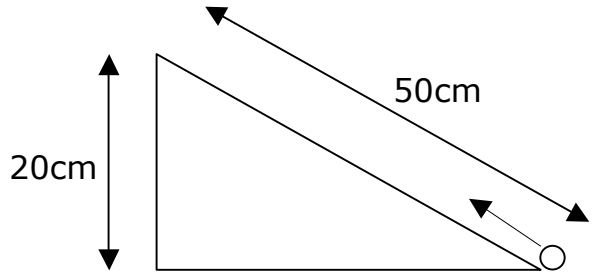
$E_p = mgh$

Rearrange to get an equation for m.

$$m = \frac{E_p}{gh} = \frac{2268}{9.8x3.6} = 64.3$$

So the mass of the man is 64.3kg.

Example:
A 800g ball is pulled up a slope as shown in the diagram. Calculate the potential energy it gains.



Solution:
In potential energy problems we are only interested in vertical distances

Use $E_p = mgh$,

h = 20cm = 0.2m
m = 800g = 0.8kg

so

$E_p = 0.8 \times 9.8 \times 0.2 = 1.6J$

remember to change units!

The ball gains 1.6J of potential energy