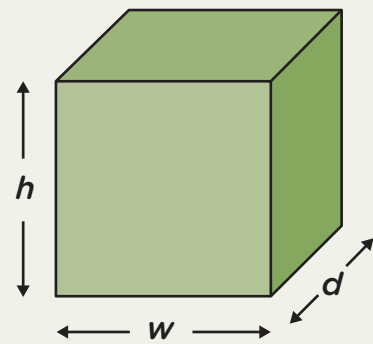## VOLUME

Volume calculations have many applications in construction tasks, including working out:
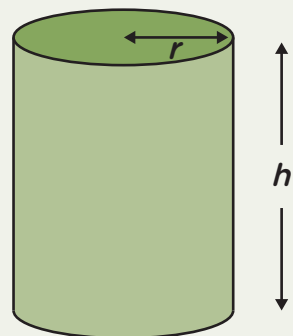
- the volume of concrete required for a floor slab
- the quantities of materials required
- estimated costs for materials
- the volume of a room to determine its heating requirements.
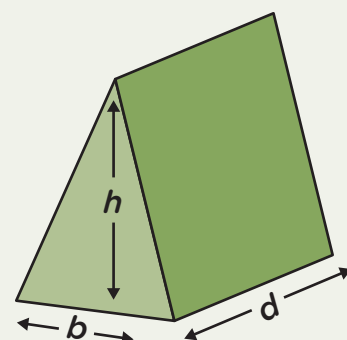
Rectangular spaces

Volume = height × width × depth

Cylindrical spaces

Volume = $\pi r^2 \times h$ (remember π is 3·14)

Triangular spaces

Volume = $\frac{(base \times height)}{2} \times$ depth

AREA

Area is important when calculating the quantities of materials needed for tasks such as:
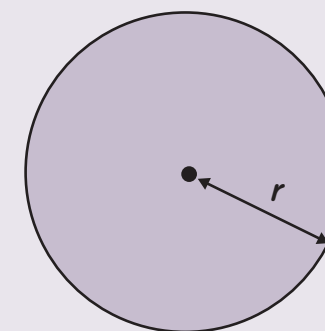
- how many tins of paint are needed to paint the walls of a room
- how many bags of plaster are required for a plastering task
- how many rolls of wallpaper are needed to paper a wall
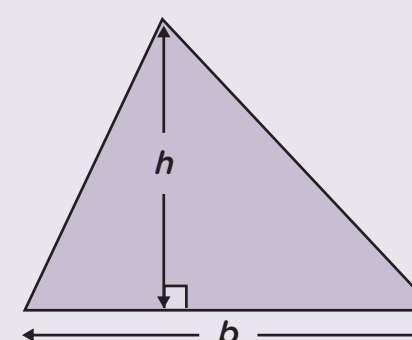- the number of carpet tiles required to cover a floor.

Rectangles

Area = length × width

Circles

Area = πr^2 (remember π is 3·14)

Triangles

Area = $\frac{(base \times height)}{2}$

PERIMETER

Perimeter is the distance around the outside of a 2D shape.

Calculating perimeters is important as a means of quantifying the number of materials required for construction activities, such as:

- the amount of fencing material needed to enclose an area of land
- the length of cabling required to reach all the sockets in a room
- the length of skirting or coving needed around the walls of a room.

6 m

4 m *4 m*

6 m
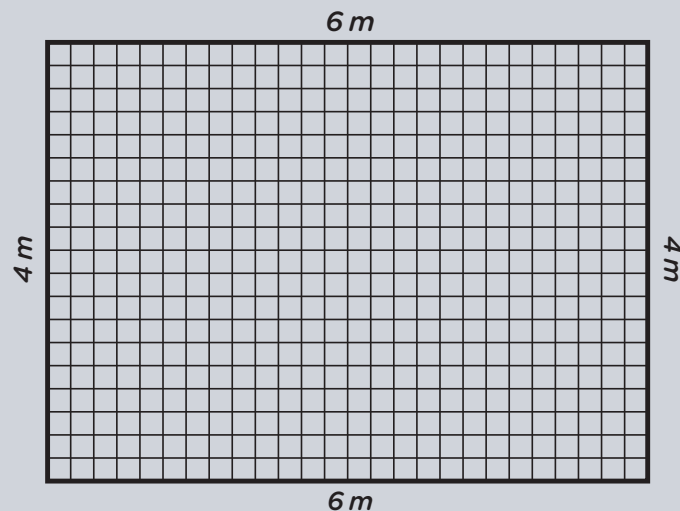
Perimeter = 6 + 4 + 6 + 4

= 20 metres

TIME

Calculating time is important not only as a means of working out how long it will take to complete construction tasks, but also:

- the number of people needed to complete a task
- the complexity of the task
- time-dependent factors such as drying time.

RATIO

Ratio is important when calculating the volume or proportion of different components required to complete a mixture, such as that of:

- concrete
- plaster
- mortar.

Many construction materials are made up of several different components that need to be mixed together correctly. Failure to do so can result in the materials failing to achieve their purpose, such as mortar failing to bond blocks together or plaster not adhering to a wall.

Strict ratios must be followed if the materials are to be mixed successfully. In construction terms, a ratio is a like-for-like quantity of two or more materials, such as 1:4.

For example, the ratio of components for a common mortar mix is:

Cement : Lime : Sand = 1 : 1 : 5

CEMENT **+** **LIME** **+** **SAND**

Mixtures are sometimes also expressed as a percentage. In this instance, the mortar mix would be rounded up to 15% cement, 15% lime and 70% sand.