Area

Area is the space inside a 2D shape

length x height | height
length

length x perpendicular height | Perpendicular height
length

Perpendicular height
length
(length x perpendicular height) ÷ 2

Perpendicular Height (h)
(a + b) x h ÷ 2

Area = Π x r²
Diameter (d)   Radius (r)
Circumference = Π x d

A compound shape is a 2D shape made up of simpler shapes
We work out its area by breaking them up and working out separate areas

5cm
Not to scale
9cm
2
3cm
1   3cm
8cm

(1) 3×3 = 9cm²
(2) 9×5 = 45cm²
45+9 = 54cm²

Volume - prisms

Is the space inside a 3D shape

A prism has a constant cross section, work out its area and multiply by length
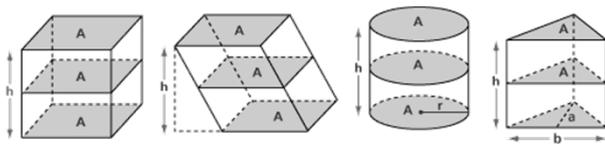
Surface area - prism

Is the total area of each individual face of a 3d shapes

Surface Area = 2lw + 2lh + 2wh

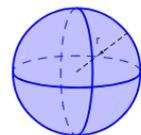## Similar shapes - lengths

Always divide 2 corresponding values to find the scale factor then
- Multiply by it to find a larger value
- Divide by it to find a smaller value

12 cm
B
C
8 cm   5 cm
A   E   10 cm   D

To calculate the length BC
$SF = \frac{12}{8} = 1.5$
$5 \times 1.5 = 7.5$
$7.5 - 5 = \textbf{2.5}cm$

Volume – pyramids and cones

As this is not a prims it has a different formula: $\frac{1}{3} \times area\ of\ base \times height$
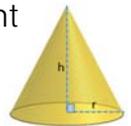
Volume – spheres

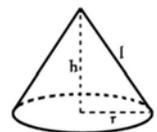As this is not a prims it has a different formula: $\frac{4}{3} \times \pi \times r^3$

Surface area - cone

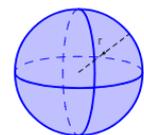Area of the circle plus the curved surface
You may have to use Pythagoras
The formula: $\pi r^2 + \pi r l$

Surface area - sphere

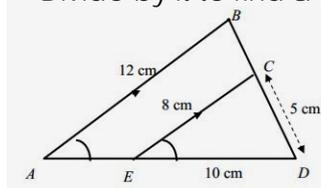Amazingly the surface area of a sphere is 4 circles
The formula: $4\pi r^2$

Density

the degree of compactness of a substance.
The formula: $denisty = \frac{mass}{volume}$

A formula triangle is often useful:

m
D × V

Similar shapes – lengths, area and volumes

When a problem involves length, area and volume you may have to change the scale factor.

LSF = length scale factors
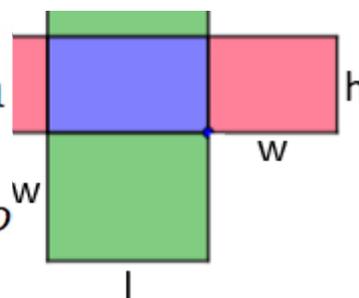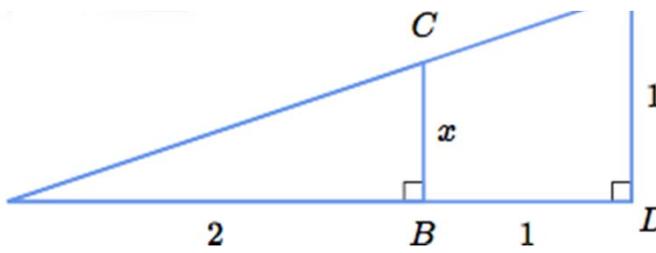ASF = area scale factors
VSF = volume scale factor

square
LSF
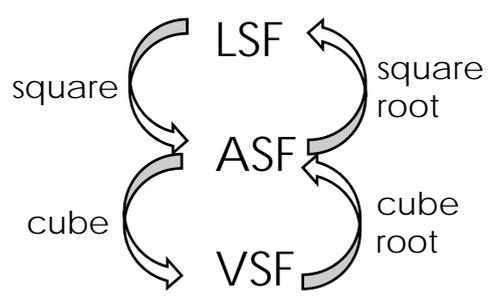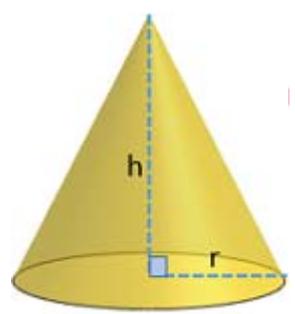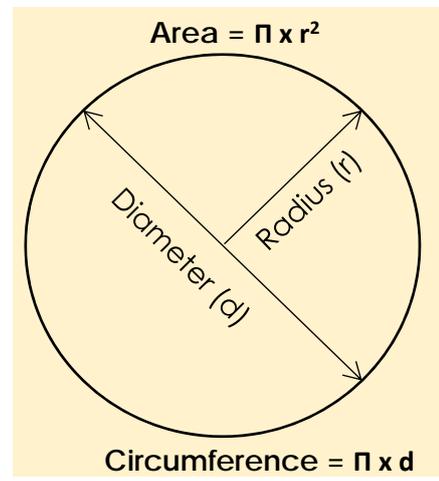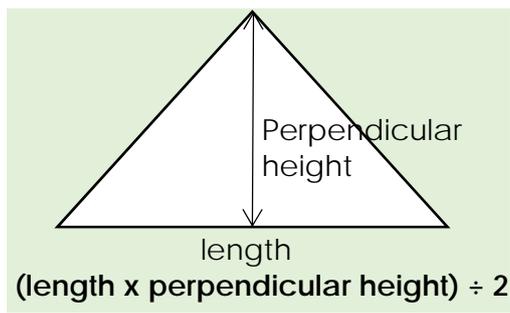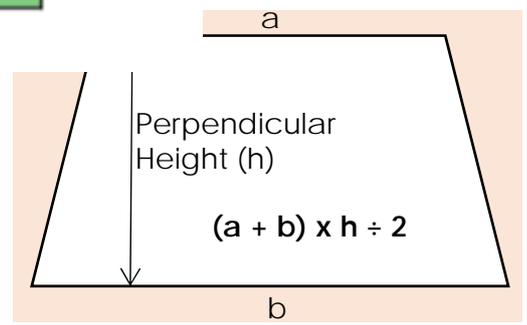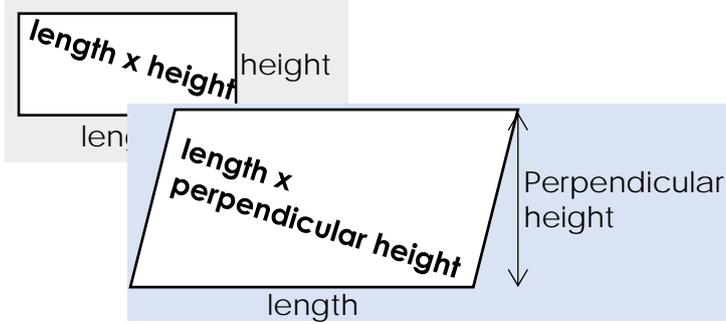square root
ASF
cube
VSF
cube root

A Surface Area = 2lw + 2lh + 2wh

Area is the space inside a 2D shape

length x height

height

length

length x perpendicular height

Perpendicular height

length

(length x perpendicular height) ÷ 2

a

Perpendicular Height (h)

(a + b) x h ÷ 2

b

Area = Π x r²

Diameter (d)

Radius (r)

Circumference = Π x d

h

r

LSF

square

square root

ASF

cube

cube root

VSF

| Calculate the area of rectangles, triangles a... |
| Calculate the area of a trapezium |
| Calculate the area of a circle |
| Calculate the area of compound shapes |
| Solve contextual area problems |
| Calculate the volume of a prism (cubes, cub... |
| Calculate the volume of a square based pyra... |
| Calculate the volume of a sphere |
| Calculate the surface area of a prism |
| Calculate the surface area of a cone |
| Calculate the surface area of a sphere |
| Calculate missing sides of similar shapes/tria... |
| Calculate the areas and volume of similar sh... |
| Calculate densities of 3D shapes |

C

x

2   B   1

D

w

1

w

h

w

l