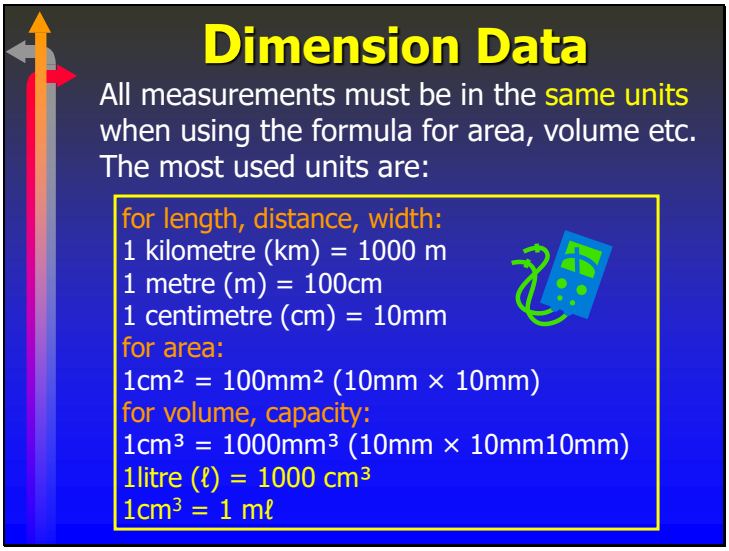
Slide 1

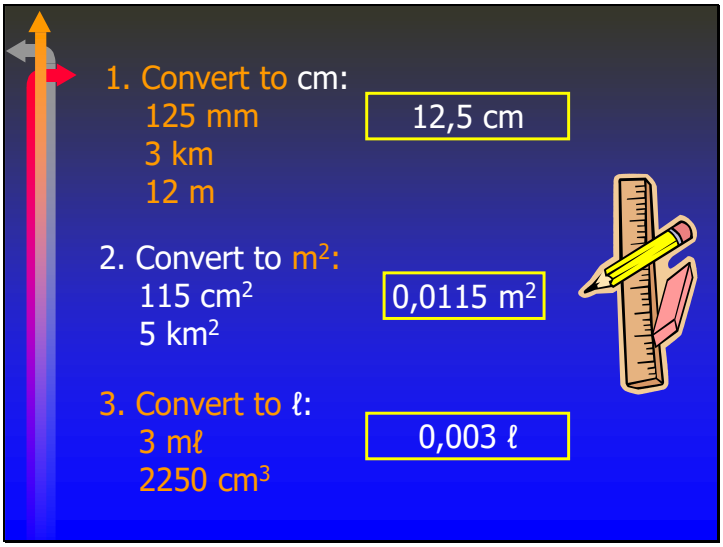
Length, Perimeter, Area & Volume

A S – 10.3.1, 10.3.2

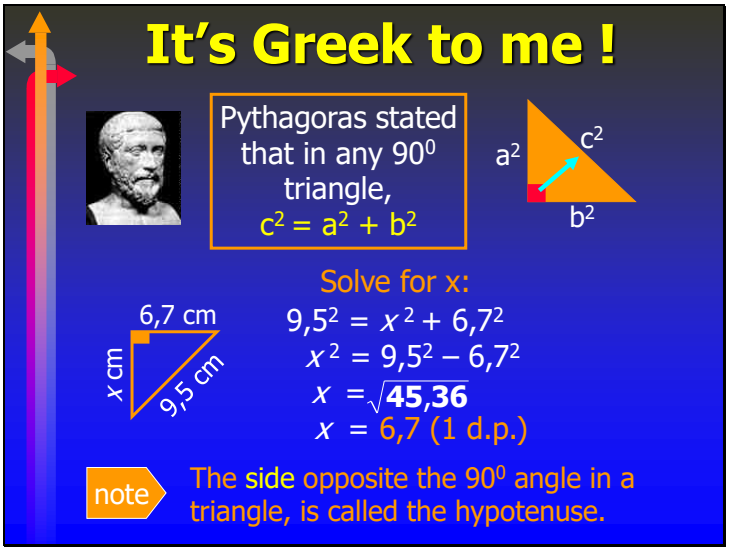
Slide 2


Dimension Data
All measurements must be in the same units when using the formula for area, volume etc. The most used units are:
for length, distance, width:
1 kilometre (km) = 1000 m
1 metre (m) = 100cm
1 centimetre (cm) = 10mm
for area:
1cm² = 100mm² (10mm × 10mm)
for volume, capacity:
1cm³ = 1000mm³ (10mm × 10mm10mm)
1litre (ℓ) = 1000 cm³
1cm³ = 1 mℓ

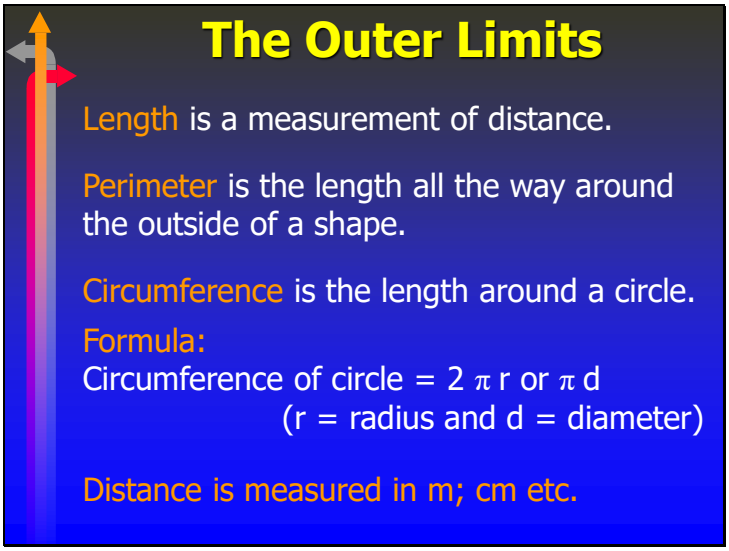
Slide 3


1. Convert to cm:
125 mm
3 km
12 m
12,5 cm
2. Convert to m²:
115 cm²
5 km²
0,0115 m²
3. Convert to ℓ:
3 mℓ
2250 cm³
0,003 ℓ

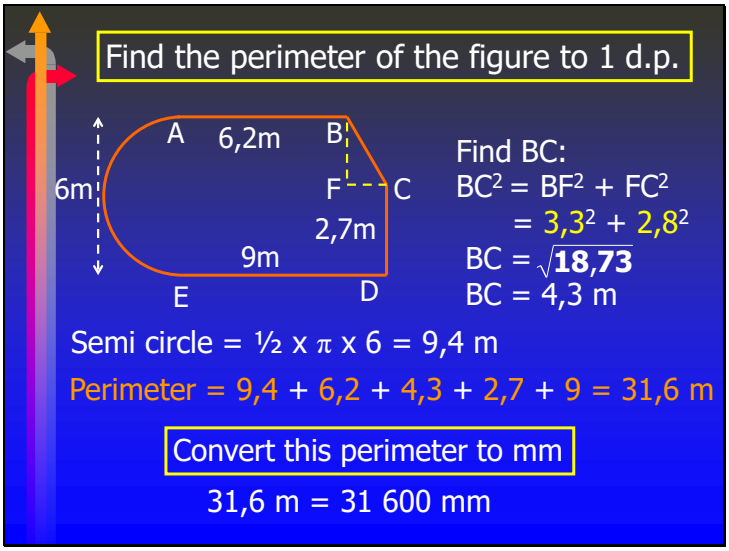
Slide 4


It's Greek to me !
Pythagoras stated that in any 90⁰ triangle,
c² = a² + b²
a²
c²
b²
Solve for x:
6,7 cm
x cm
9,5 cm
9,5² = x² + 6,7²
x² = 9,5² – 6,7²
x = √45,36
x = 6,7 (1 d.p.)
note
The side opposite the 90⁰ angle in a triangle, is called the hypotenuse.

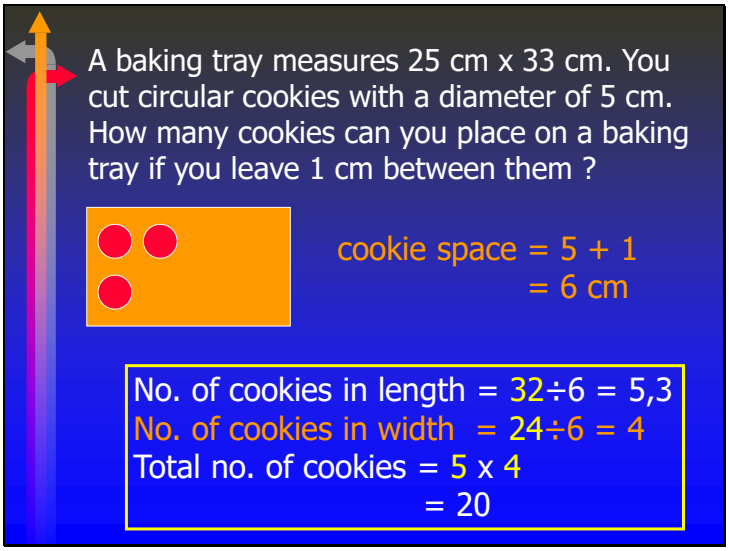
Slide 5


The Outer Limits
Length is a measurement of distance.
Perimeter is the length all the way around the outside of a shape.
Circumference is the length around a circle.
Formula:
Circumference of circle = 2 π r or π d
(r = radius and d = diameter)
Distance is measured in m; cm etc.

Slide 6


Find the perimeter of the figure to 1 d.p.
A
6,2m
B
6m
F
C
2,7m
9m
E
D
Find BC:
BC² = BF² + FC²
= 3,3² + 2,8²
BC = √18,73
BC = 4,3 m
Semi circle = ½ x π x 6 = 9,4 m
Perimeter = 9,4 + 6,2 + 4,3 + 2,7 + 9 = 31,6 m
Convert this perimeter to mm
31,6 m = 31 600 mm

Slide 7


A baking tray measures 25 cm x 33 cm. You cut circular cookies with a diameter of 5 cm. How many cookies can you place on a baking tray if you leave 1 cm between them ?
cookie space = 5 + 1
= 6 cm
No. of cookies in length = 32÷6 = 5,3
No. of cookies in width = 24÷6 = 4
Total no. of cookies = 5 x 4
= 20

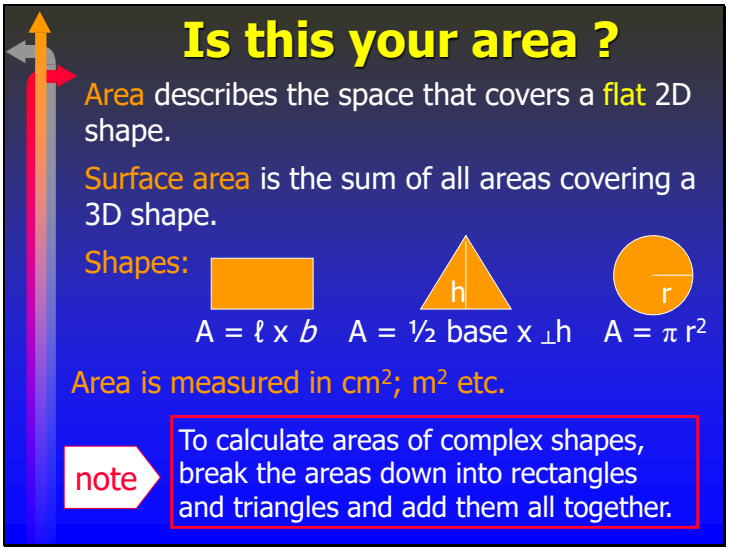
Slide 8

Sue needs kitchen curtains. The window is 2,75 m wide and 1,40 m high. Allow 25 cm extra length for a rod and hem. The curtain width must be double the width of the window. The curtaining roll Sue likes is 140 cm wide.

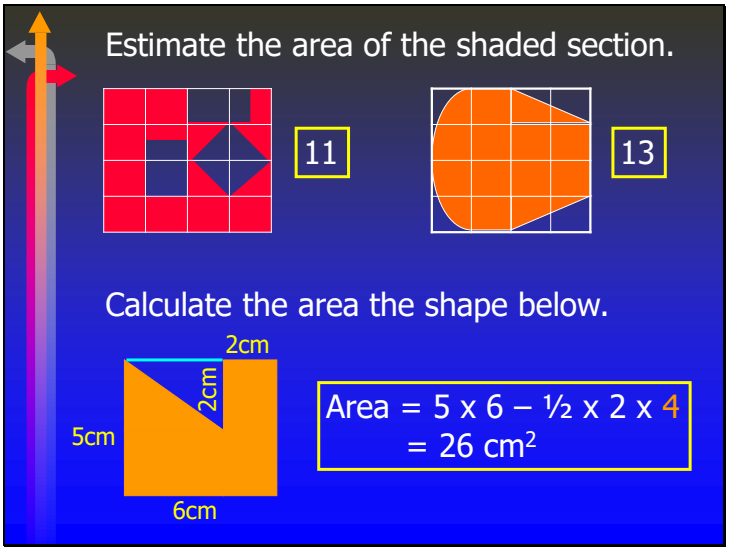
How many metres must she buy ?

Total drop length =
Total width =
No. of drops =
Drops needed =
Total curtain length =

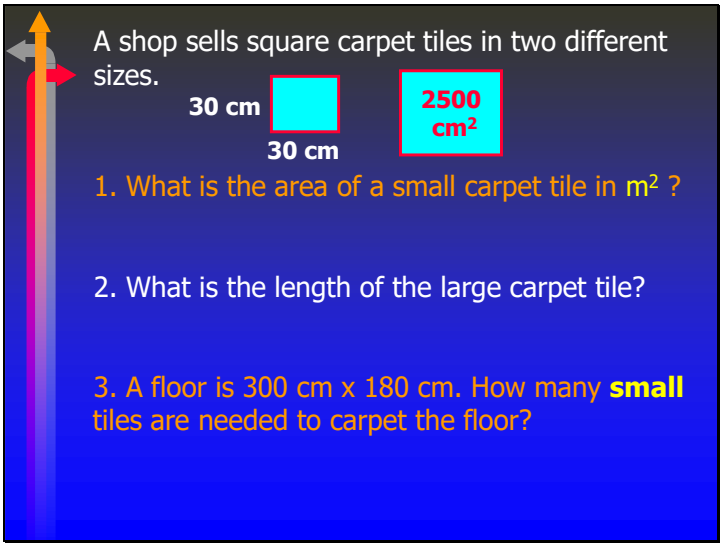
Slide 9


Is this your area ?
Area describes the space that covers a flat 2D shape.
Surface area is the sum of all areas covering a 3D shape.
Shapes:
h
r
A = ℓ x b
A = ½ base x ⊥h
A = π r²
Area is measured in cm²; m² etc.
note
To calculate areas of complex shapes, break the areas down into rectangles and triangles and add them all together.

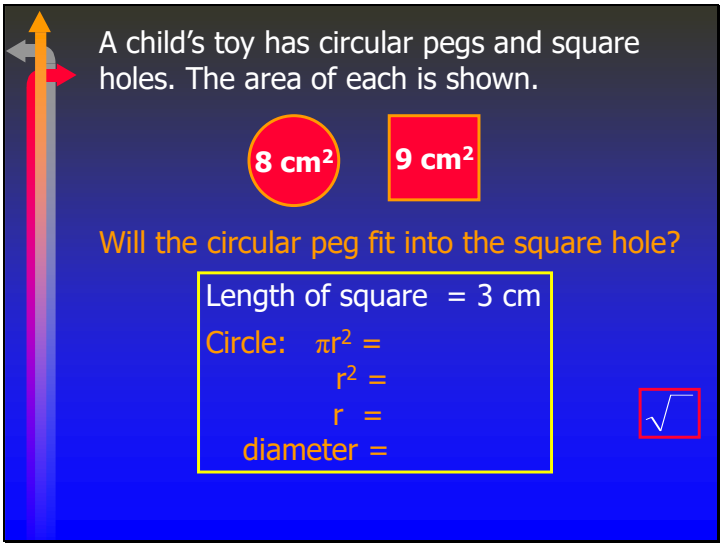
Slide 10


Estimate the area of the shaded section.
11
13
Calculate the area the shape below.
2cm
2cm
5cm
6cm
Area = 5 x 6 – ½ x 2 x 4
= 26 cm²

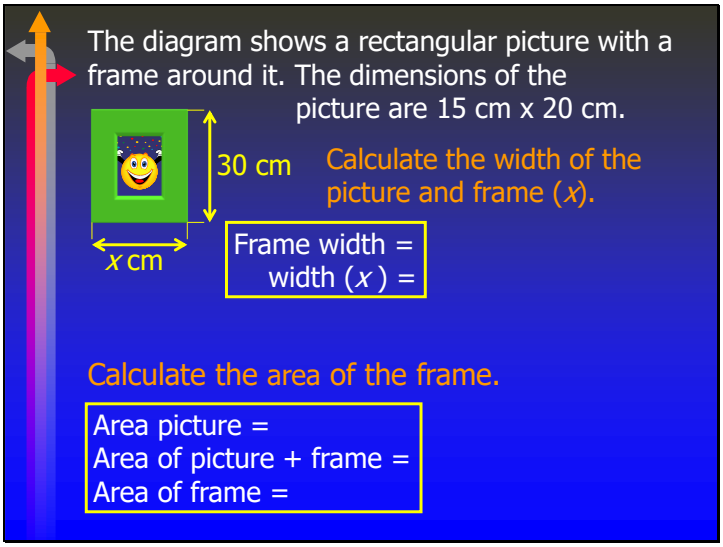
Slide 11


A shop sells square carpet tiles in two different sizes.
30 cm
30 cm
2500 cm²
1. What is the area of a small carpet tile in m² ?
2. What is the length of the large carpet tile?
3. A floor is 300 cm x 180 cm. How many small tiles are needed to carpet the floor?

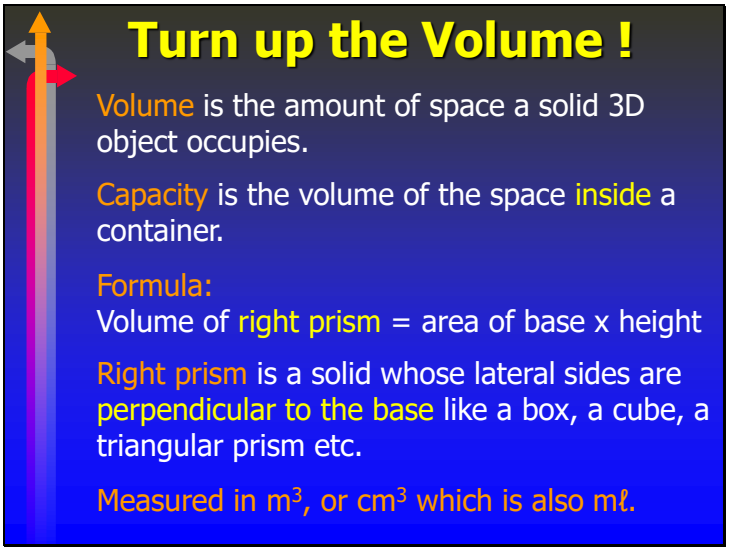
Slide 12


A child's toy has circular pegs and square holes. The area of each is shown.
8 cm²
9 cm²
Will the circular peg fit into the square hole?
Length of square = 3 cm
Circle: πr² =
r² =
r =
diameter =
√

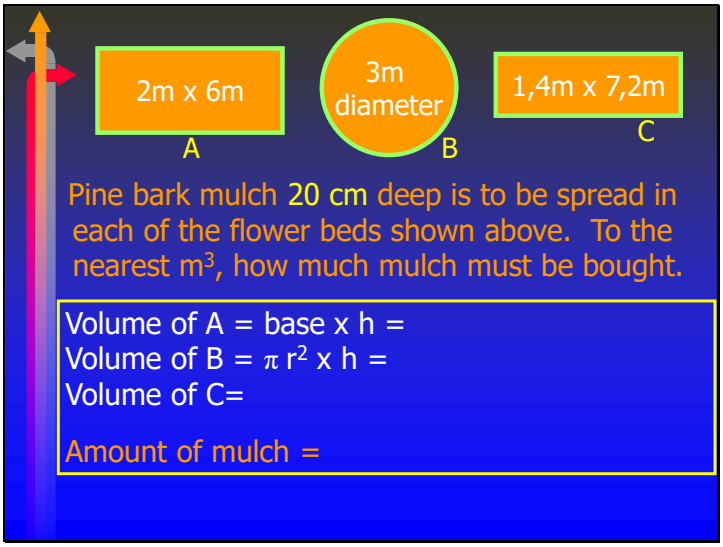
Slide 13


The diagram shows a rectangular picture with a frame around it. The dimensions of the picture are 15 cm x 20 cm.
30 cm
x cm
Calculate the width of the picture and frame (x).
Frame width =
width (x) =
Calculate the area of the frame.
Area picture =
Area of picture + frame =
Area of frame =

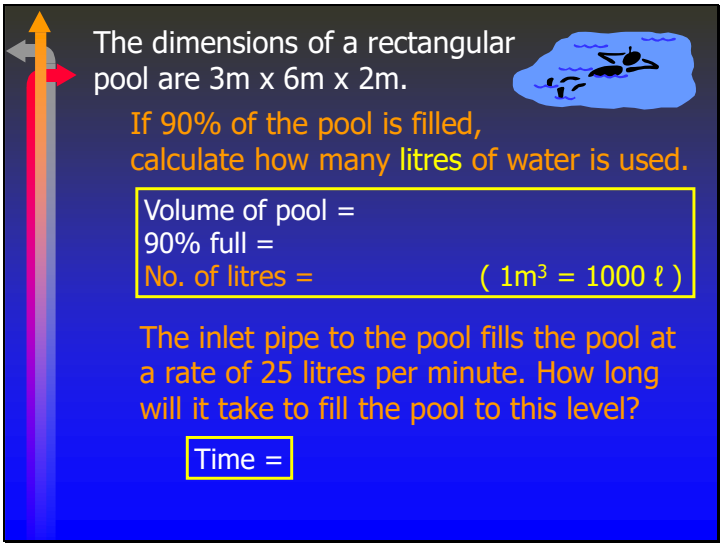
Slide 14


Turn up the Volume !
Volume is the amount of space a solid 3D object occupies.
Capacity is the volume of the space inside a container.
Formula:
Volume of right prism = area of base x height
Right prism is a solid whose lateral sides are perpendicular to the base like a box, a cube, a triangular prism etc.
Measured in m³, or cm³ which is also mℓ.

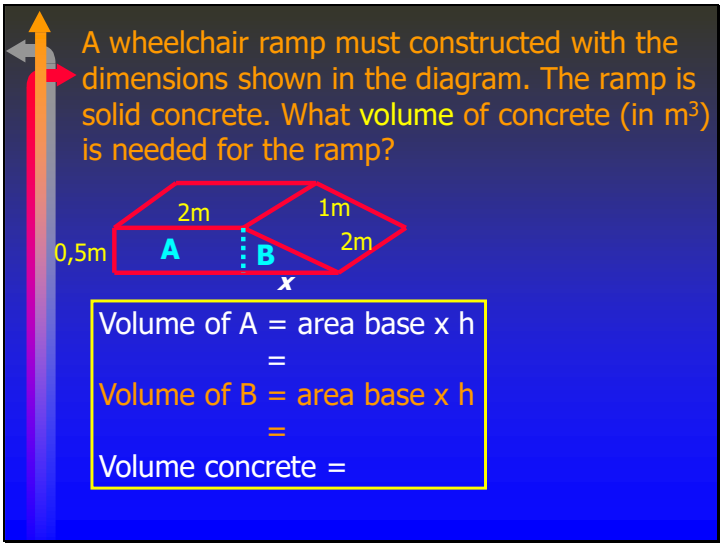
Slide 15


2m x 6m
A
3m diameter
B
1,4m x 7,2m
C
Pine bark mulch 20 cm deep is to be spread in each of the flower beds shown above. To the nearest m³, how much mulch must be bought.
Volume of A = base x h =
Volume of B = π r² x h =
Volume of C=
Amount of mulch =

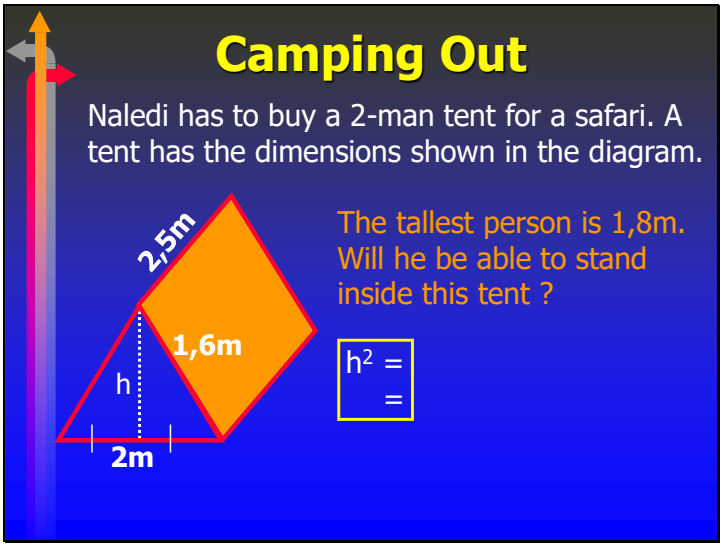
Slide 16


The dimensions of a rectangular pool are 3m x 6m x 2m.
If 90% of the pool is filled, calculate how many litres of water is used.
Volume of pool =
90% full =
No. of litres =
(1m³ = 1000 ℓ)
The inlet pipe to the pool fills the pool at a rate of 25 litres per minute. How long will it take to fill the pool to this level?
Time =

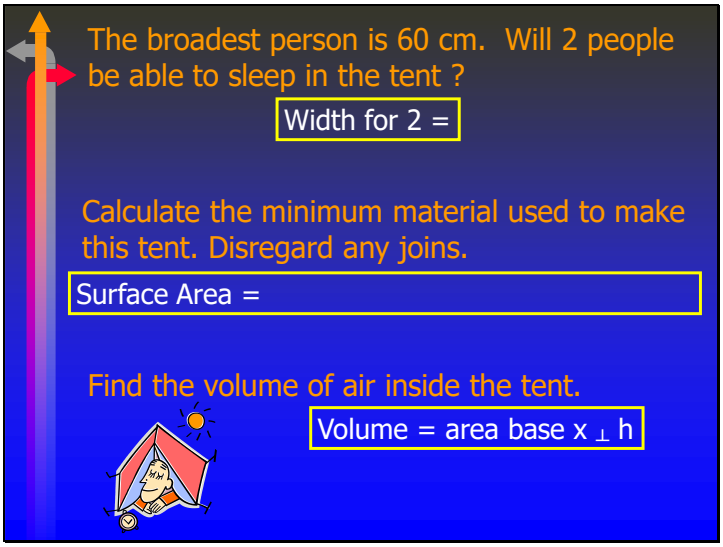
Slide 17


A wheelchair ramp must constructed with the dimensions shown in the diagram. The ramp is solid concrete. What volume of concrete (in m³) is needed for the ramp?
2m
1m
2m
0,5m
A
B
x
Volume of A = area base x h
=
Volume of B = area base x h
=
Volume concrete =

Slide 18


Camping Out
Naledi has to buy a 2-man tent for a safari. A tent has the dimensions shown in the diagram.
2,5m
1,6m
h
2m
The tallest person is 1,8m. Will he be able to stand inside this tent ?
$h^2 =$
$=$

Slide 19


The broadest person is 60 cm. Will 2 people be able to sleep in the tent ?
Width for 2 =
Calculate the minimum material used to make this tent. Disregard any joins.
Surface Area =
Find the volume of air inside the tent.
Volume = area base x ⊥ h