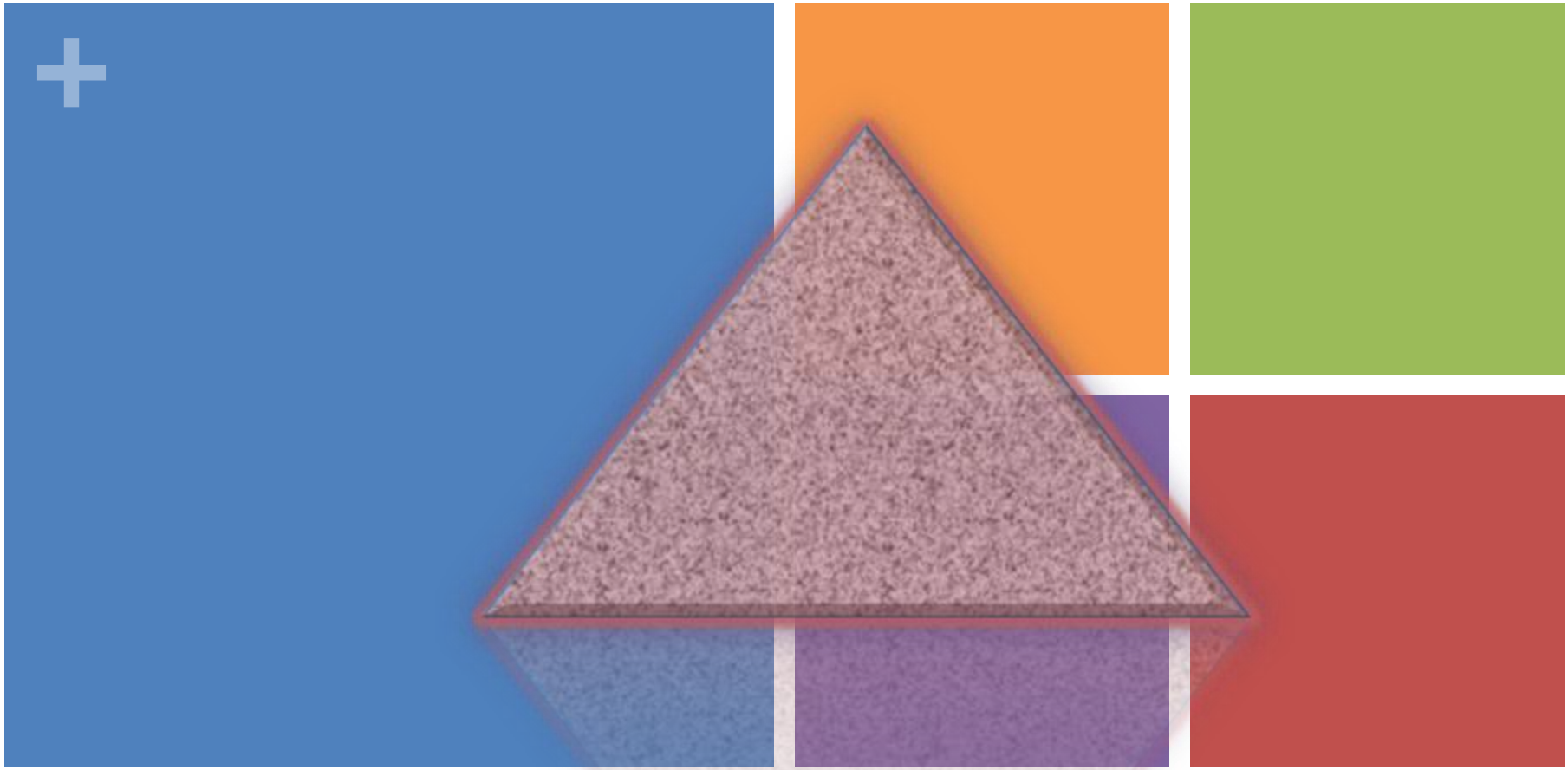
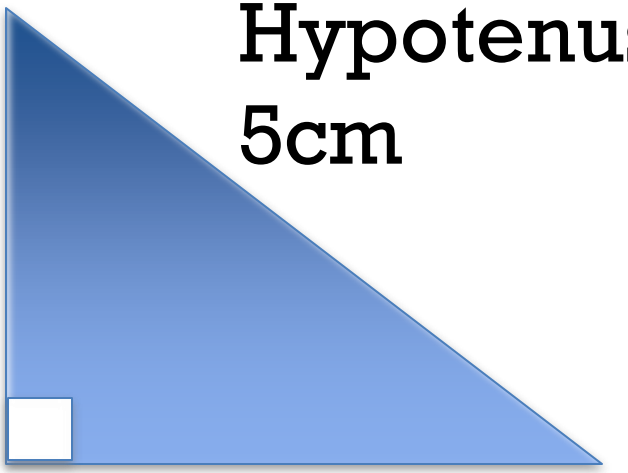


CHAPTER 4: MEASUREMENT

THEOREM OF PYTHAGORAS

In a right-angled triangle, the sum of the two sides squared equals the hypotenuse squared.



$(\text{hypotenuse})^2$
$=(\text{side})^2 + (\text{side})^2$
$=(3)^2 + (4)^2$
$= (5)^2$

THEOREM OF PYTHAGORAS

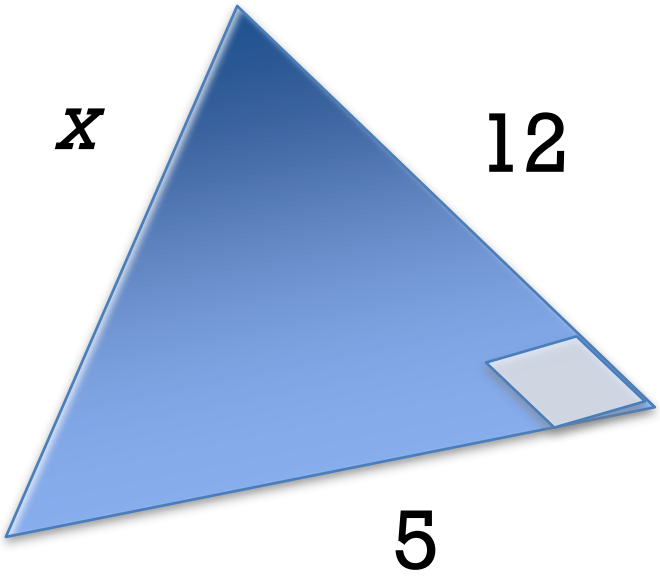
Introduction to the Theorem of Pythagoras

Pythagorean Problems

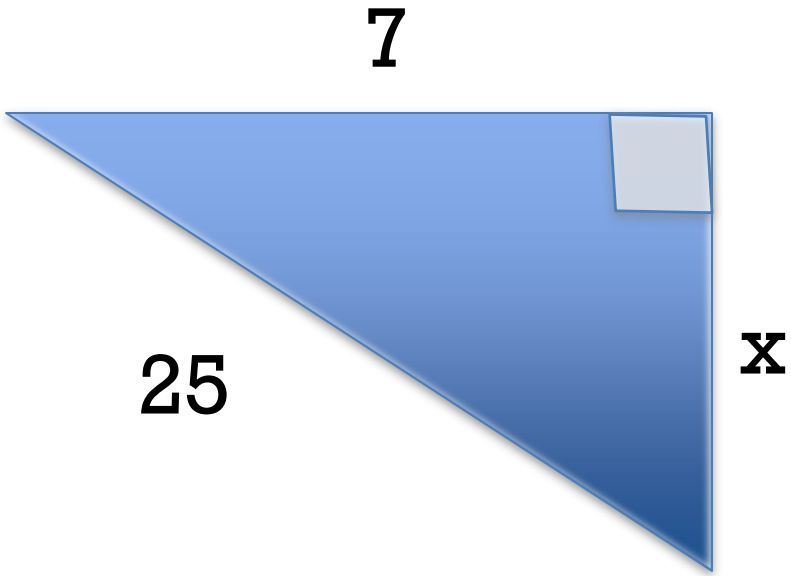
EXERCISE!

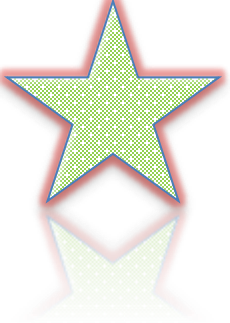
Solve for x:

1.

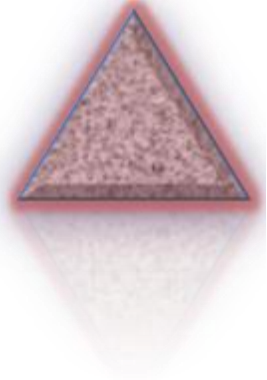


2.





PERIMETER



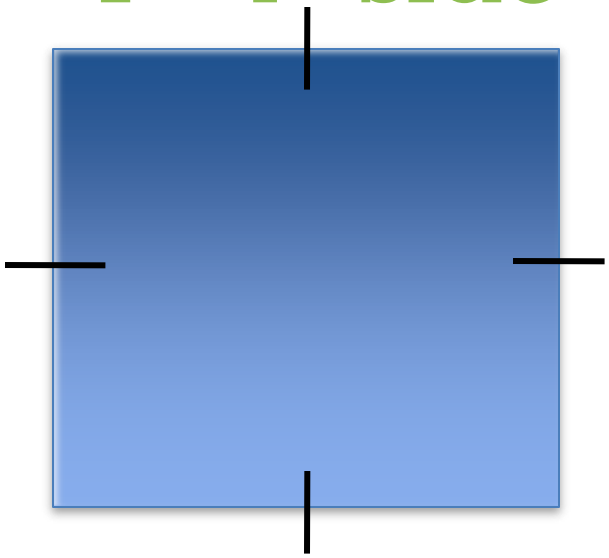
Introduction to Perimeter

Understanding Perimeter

PERIMETER

Square:

$P=4\times side$



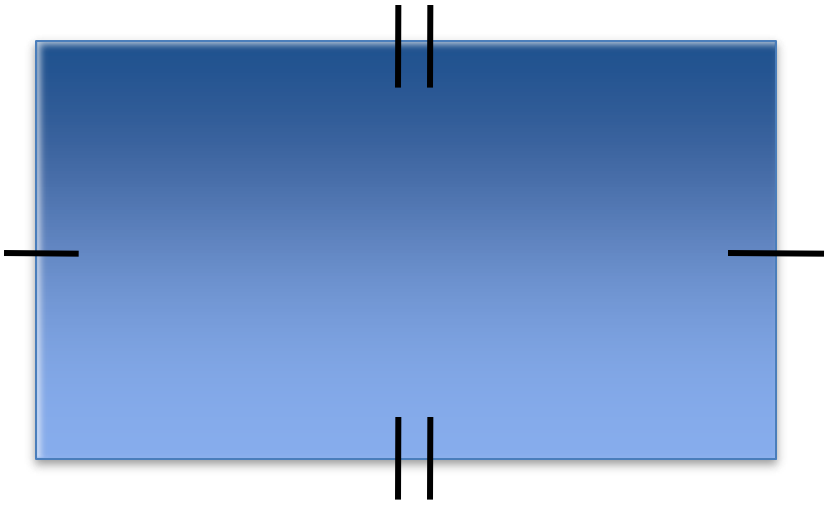
Side = 6mm

$\therefore P=4\times 6$

$=24mm$

Rectangle:

$P=2l + 2b = 2(l + b)$



l = 8cm

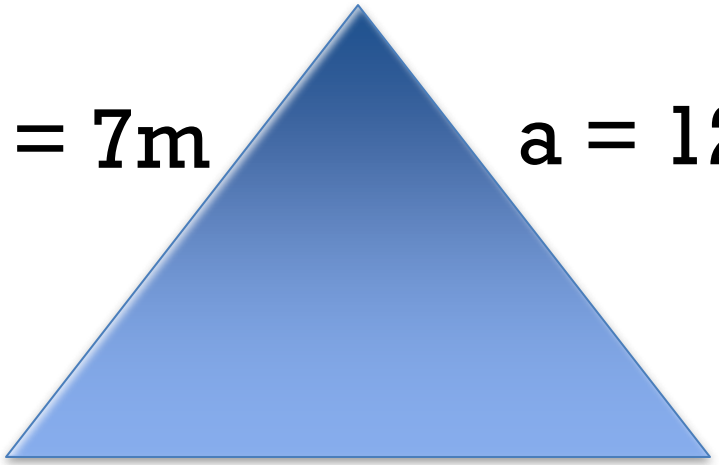
$\therefore P=2(8+3)$

$=22$ cm

PERIMETER

Triangle:

$P = a+b+c$

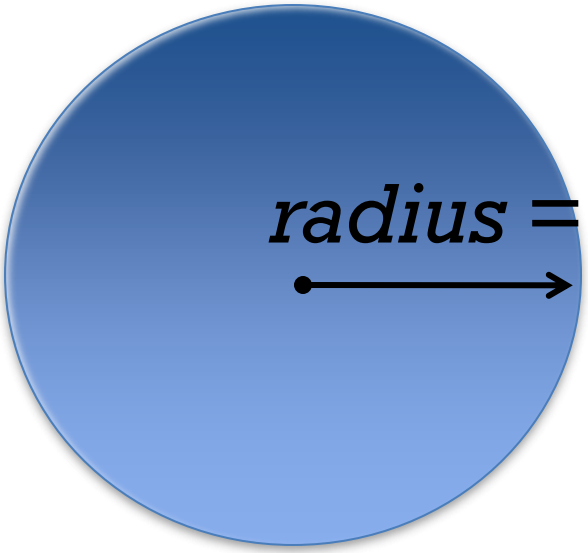


$\therefore P = 7+12+19$

$= 38m$

Circle:

$C = 2\pi r$



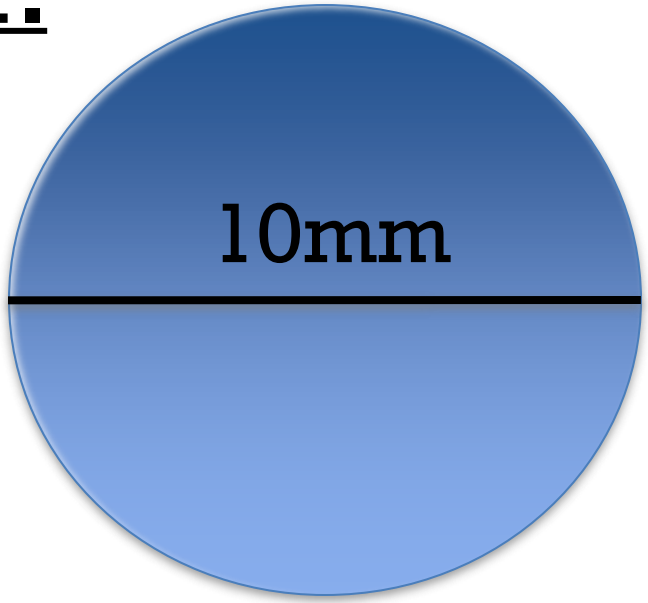
$\therefore C = 2\pi\ (4)$

$= 25.13mm$

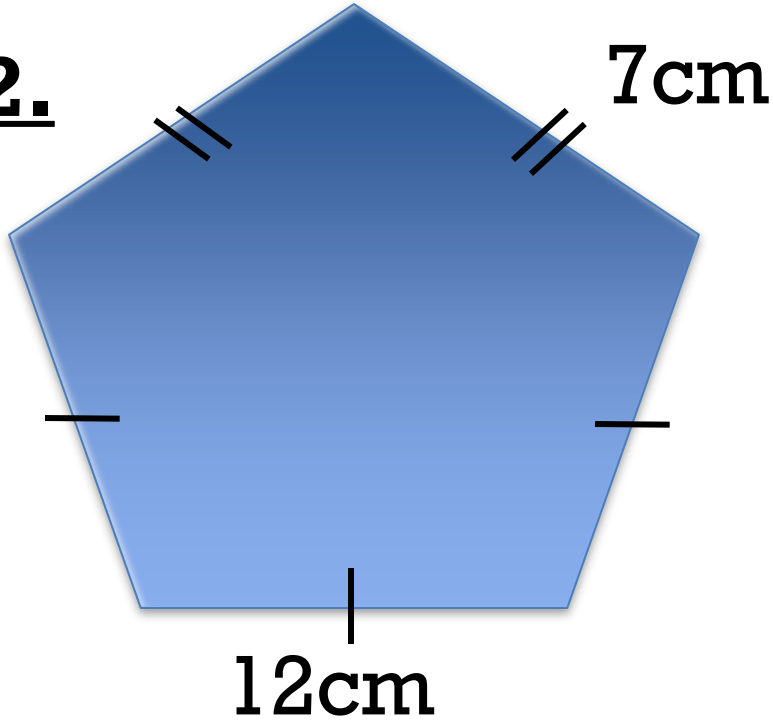
EXERCISE!

1. Determine the perimeter of the shapes:

1.1.

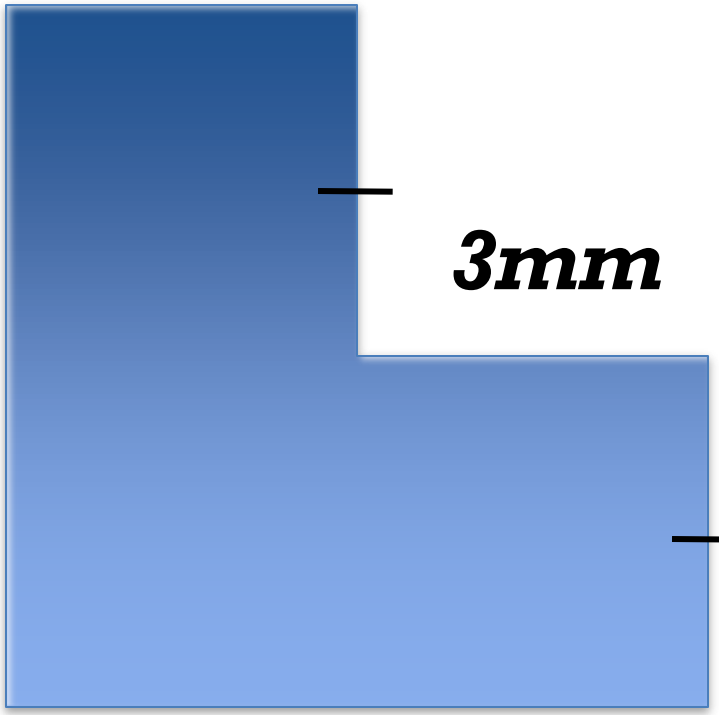


1.2.

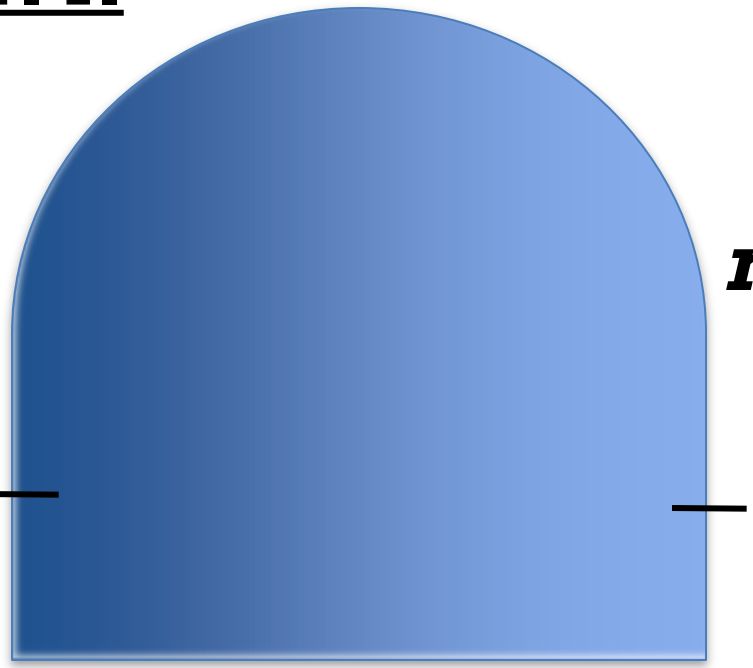


EXERCISE!

1.3.



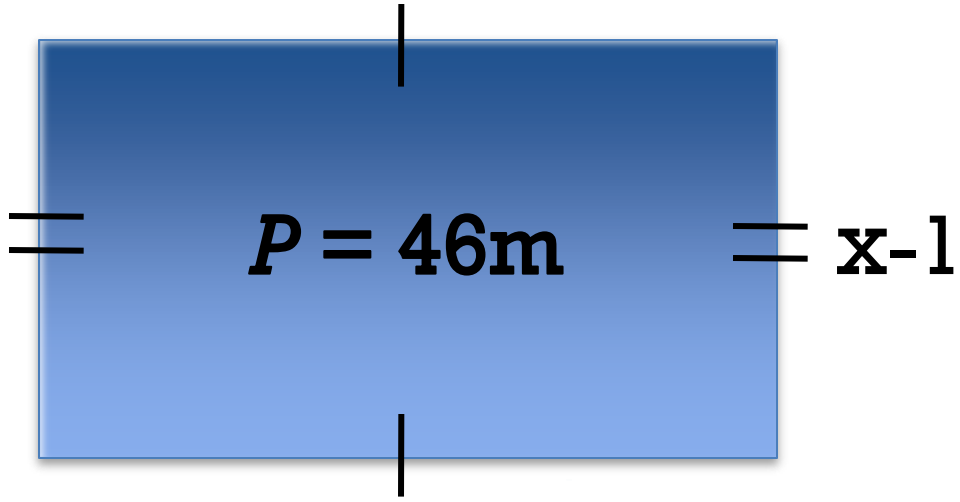
1.4.



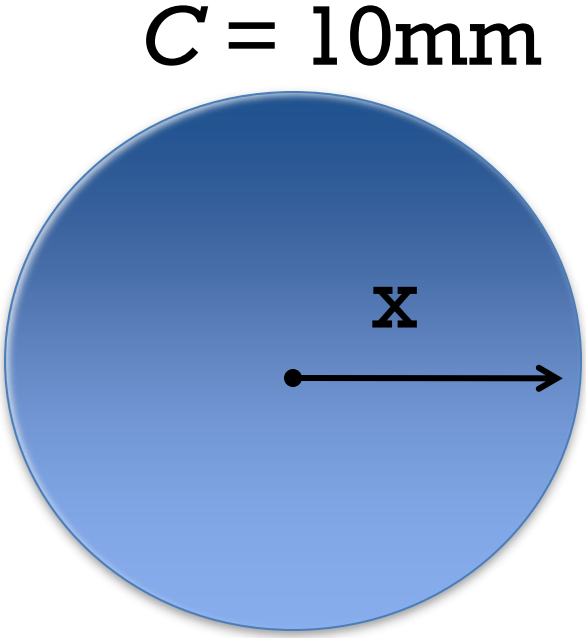
EXERCISE!

2. Solve for x:

2.1



2.2



AREA

Understanding Area

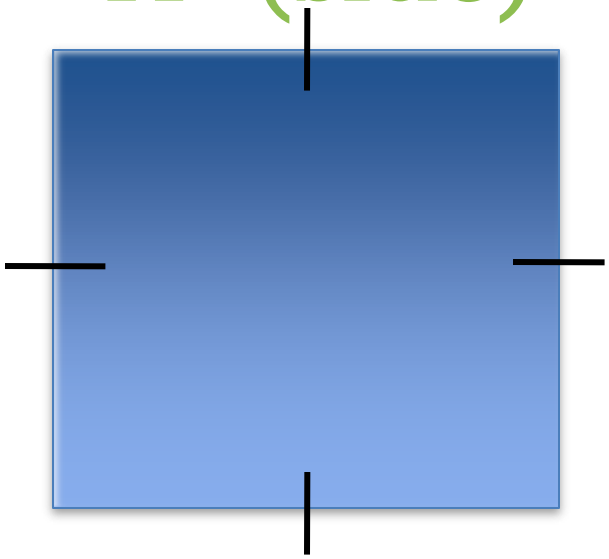
Perimeter & Area of Triangles

Circumference & Area of Circles

AREA

Square:

$A=(\text{side})^2$



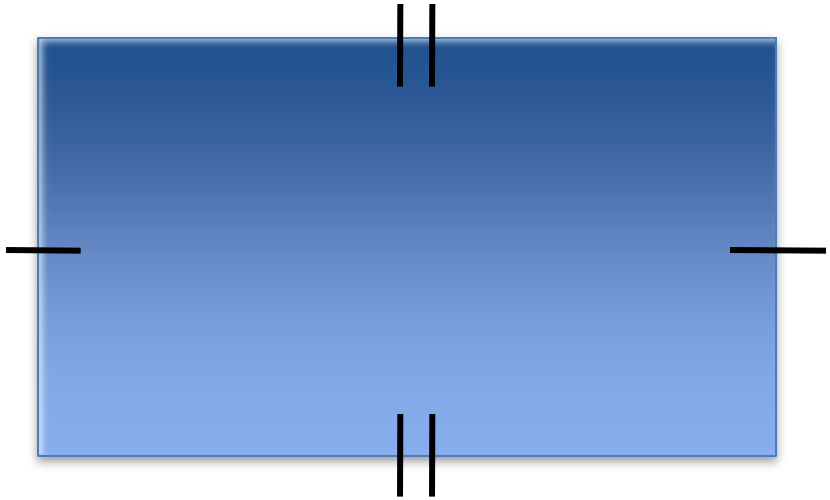
Side = 6mm

$\therefore A=(6)^2$

$=36mm^2$

Rectangle:

$A=l \times b$



b = 3cm

l = 8cm

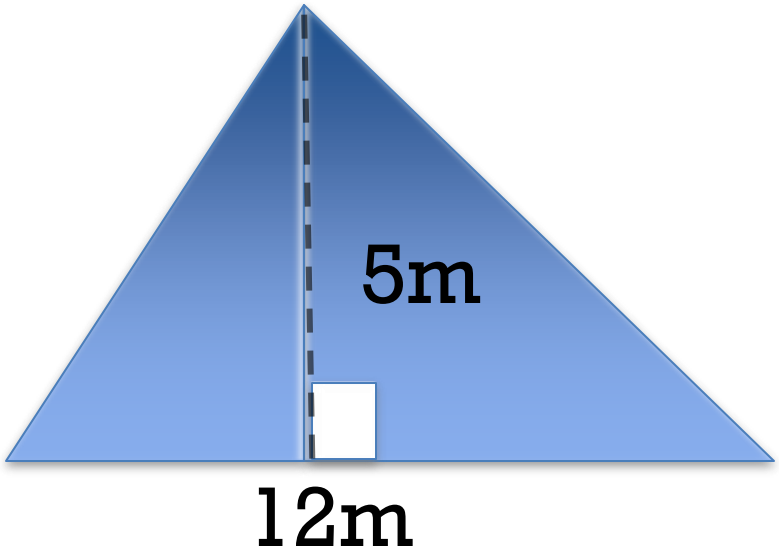
$\therefore A=8\times3$

$=24\ cm^2$

AREA

Triangle:

$A = \frac{1}{2} b \times \perp h$

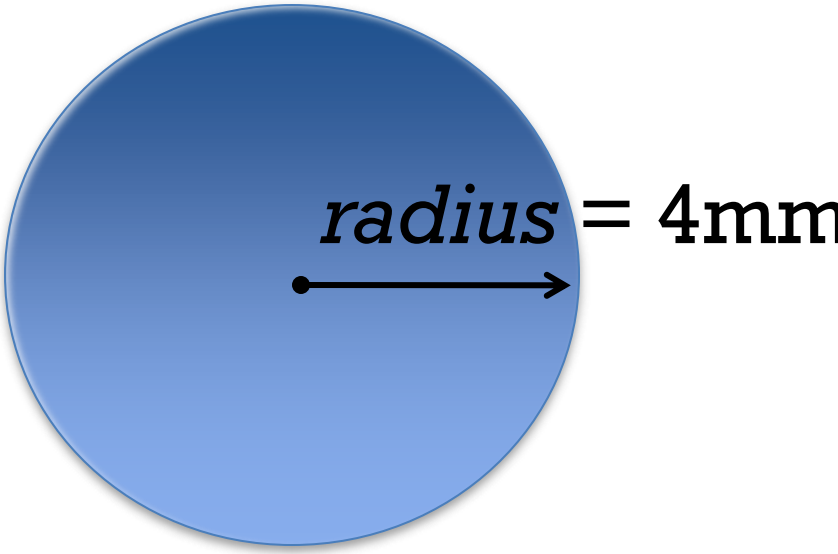


$\therefore A = \frac{1}{2}(12)(5)$

$= 30m^2$

Circle:

$A = \pi r^2$



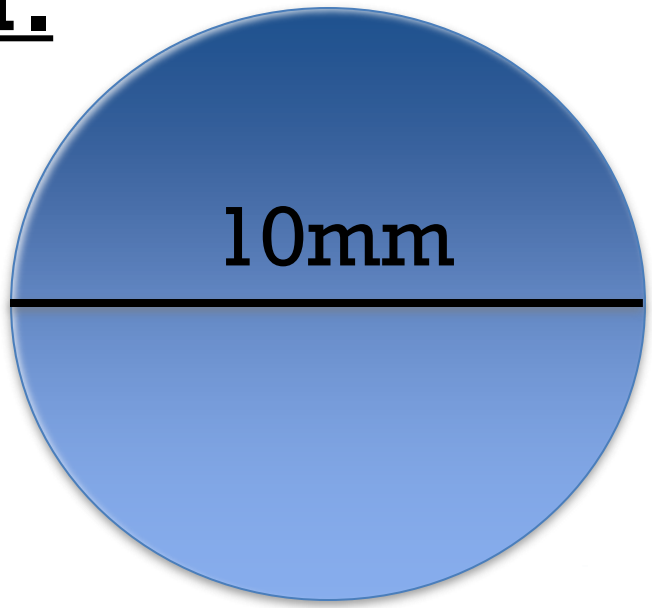
$\therefore A = \pi (4)^2$

$= 50.27mm$

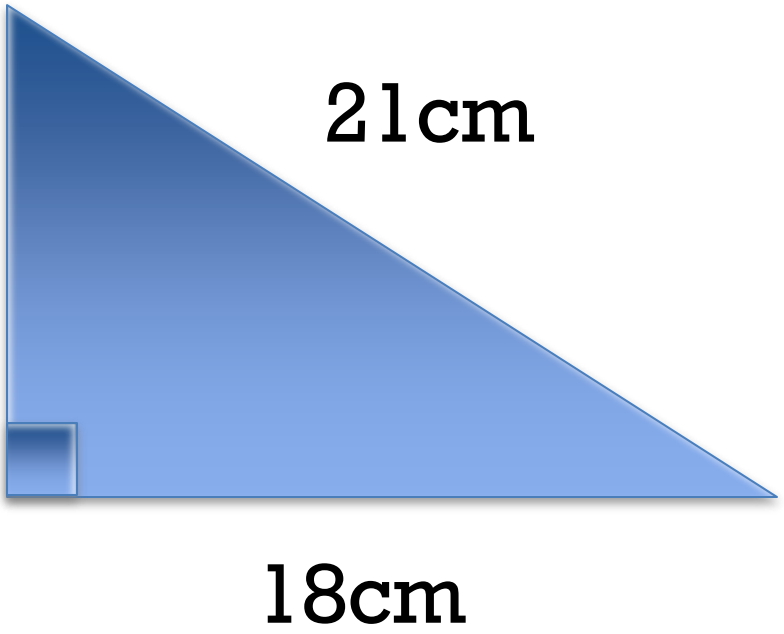
EXERCISE!

1. Determine the area of the shapes:

1.1.



1.2.



EXERCISE!

2.1. Determine the length of a rectangle given the breadth of 2cm and the area of $24cm^2$.

2.2. Determine the diameter of a circle, if the area is 60 mm^2

PERIMETER & AREA of COMPLEX SHAPES

Perimeter & Area of Complex Shapes

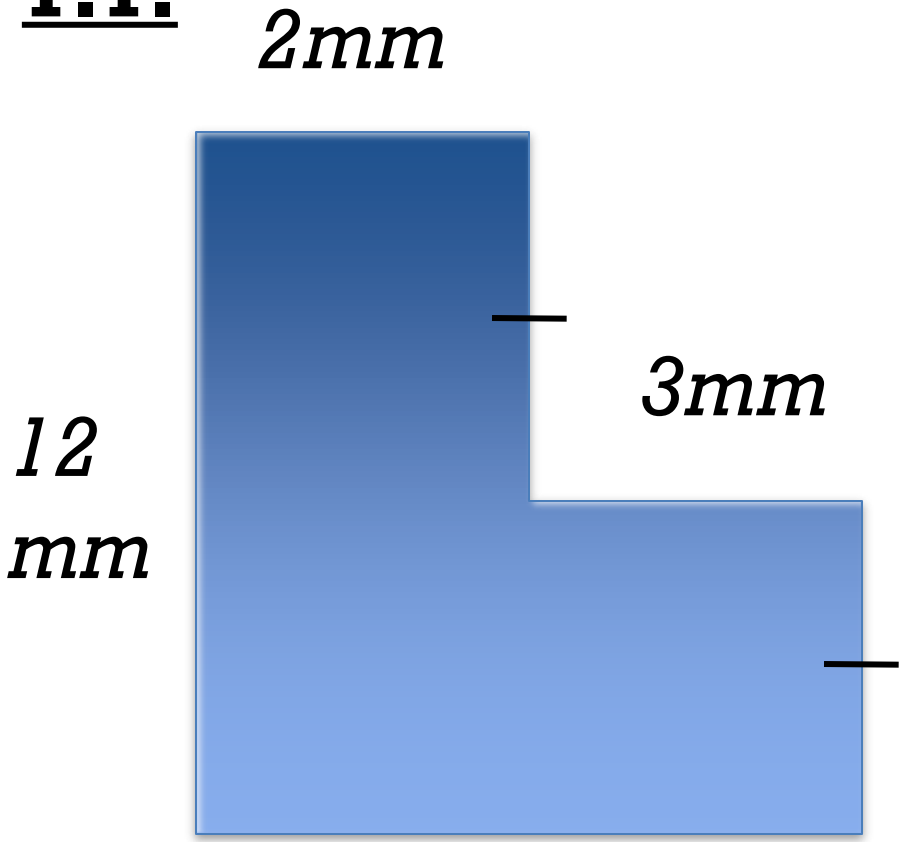
Perimeter & Area of Irregular Shapes

Can shapes with the same area have different perimeters?

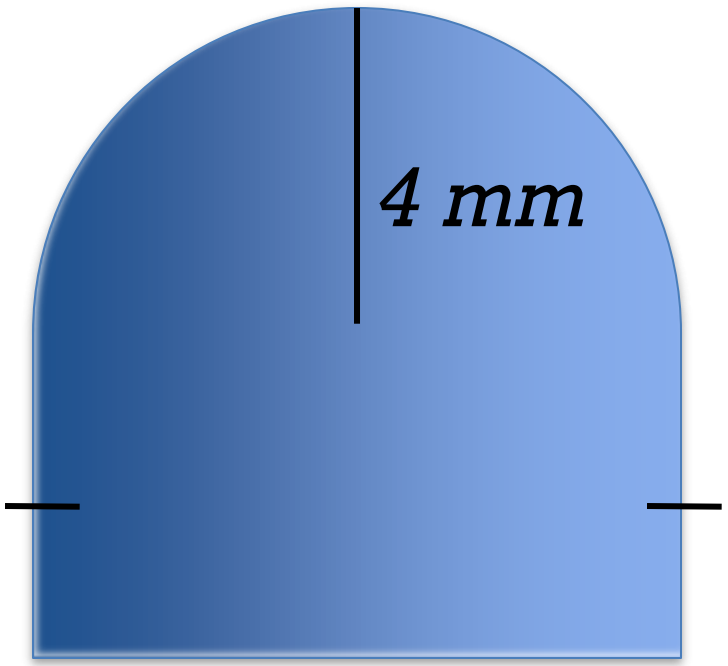
EXERCISE!

1. Determine the perimeter AND area:

1.1.



1.2.



TOTAL SURFACE AREA

Calculating TSA using nets

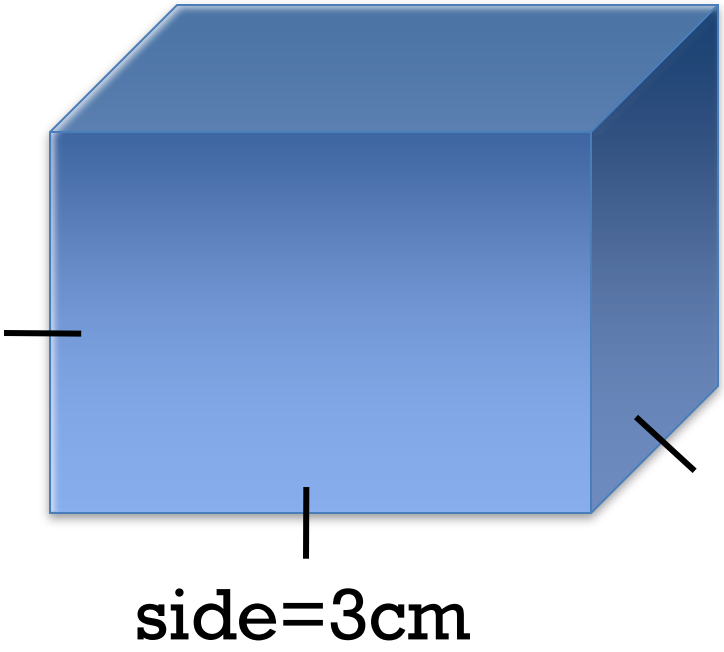
Surface Areas of Prisms

Complex Surface Area Examples

TOTAL SURFACE AREA

Cube:

TSA= $6\times(\text{side})^2$



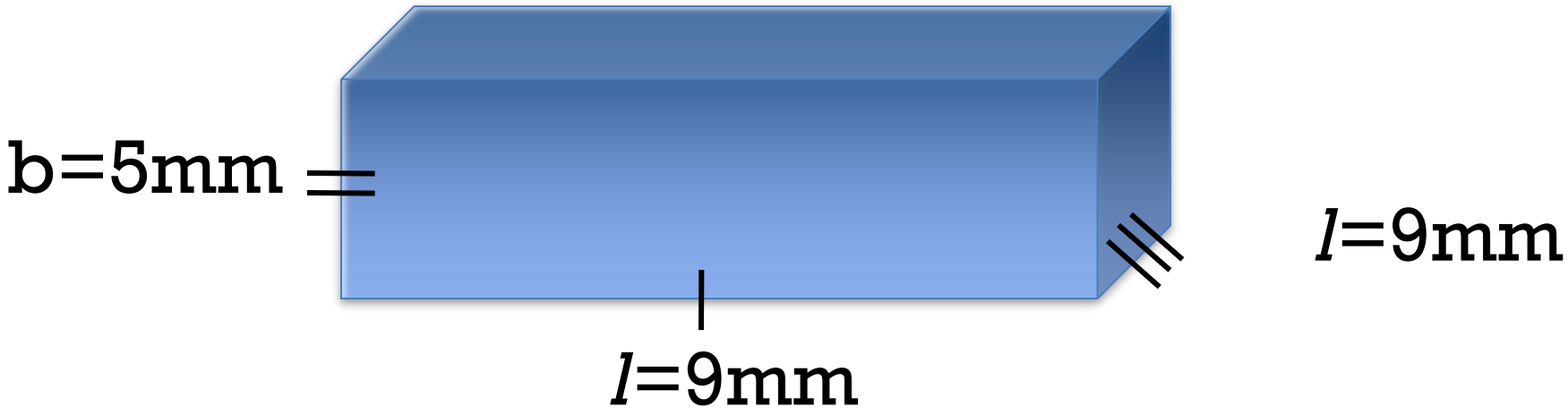
$\therefore$ TSA $= 6\times(3)^2$

$= 54\text{cm}^2$

TOTAL SURFACE AREA

Rectangular prism:

$TSA = 2(l \times b) + 2(l \times h) + 2(b \times h)$



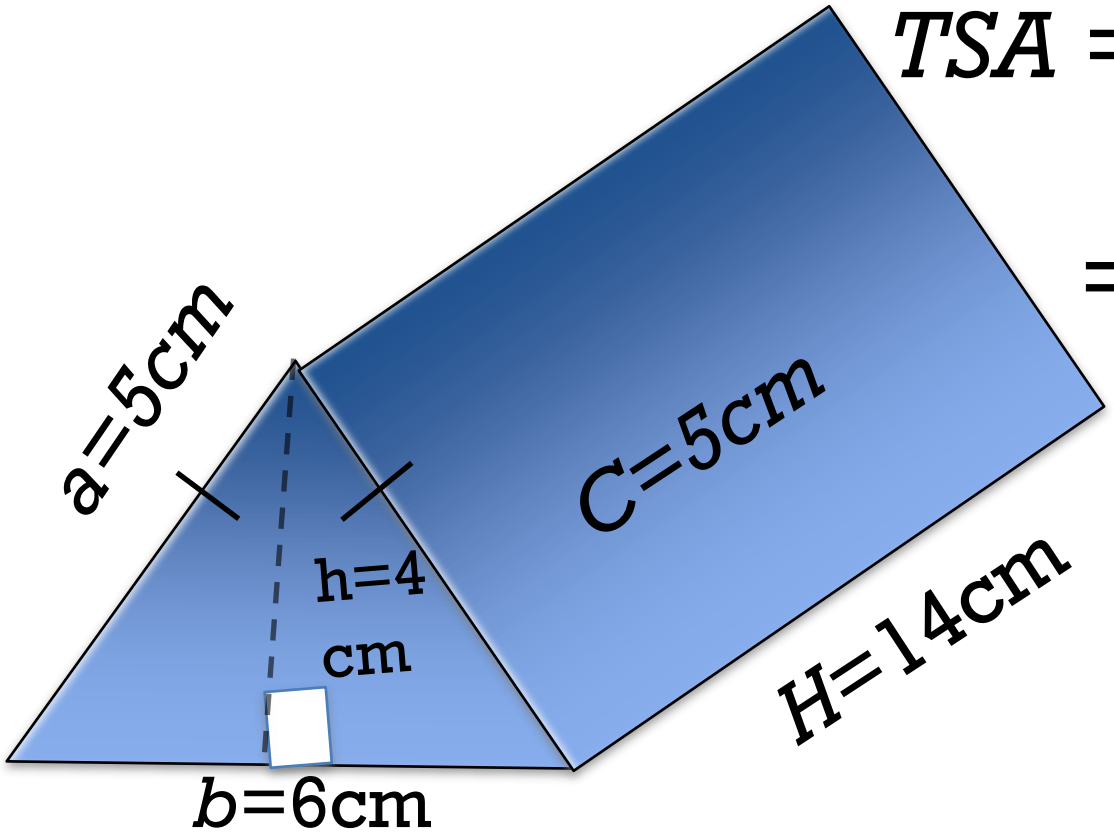
$\therefore$ TSA $= 2(9 \times 5) + 2(9 \times 3) + 2(5 \times 3)$

$= 174\text{mm}^2$

TOTAL SURFACE AREA

Triangular prism:

$TSA = 2(\frac{1}{2} \times \perp h)+(a \times h)+(b \times H)(c \times H)$

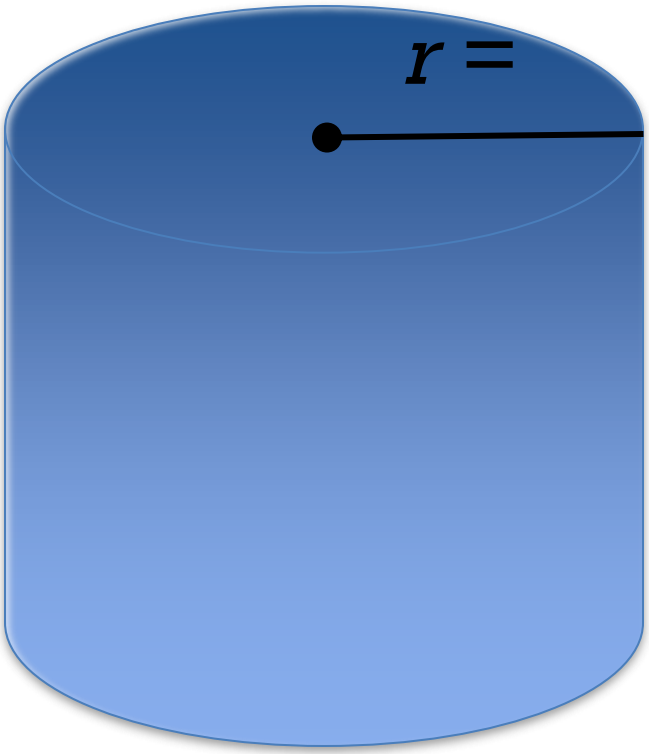


$TSA = 2(\frac{1}{2} \times 6 \times 4)+(5 \times 4)$
$+(6 \times 14)(5 \times 14)$
$= 248cm^2$

TOTAL SURFACE AREA

Cylinder:

$TSA = 2\pi r^2 + 2\pi r$



$r =$ 2mm

H=6mm

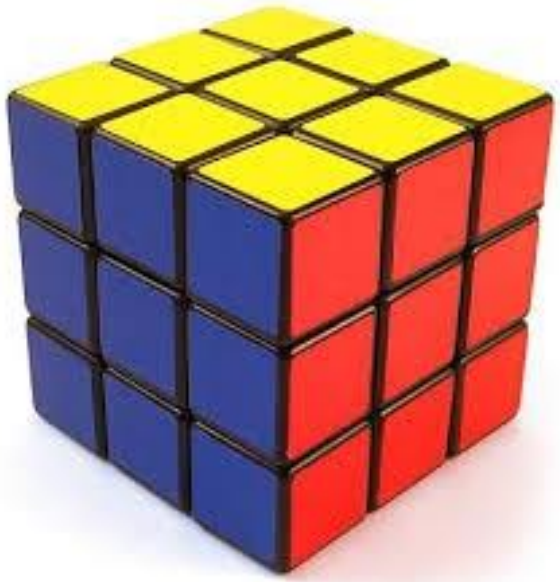
$$\therefore TSA = \pi r(2) + 2\pi\ (2)(6)$$

$$= 100.53mm^2$$

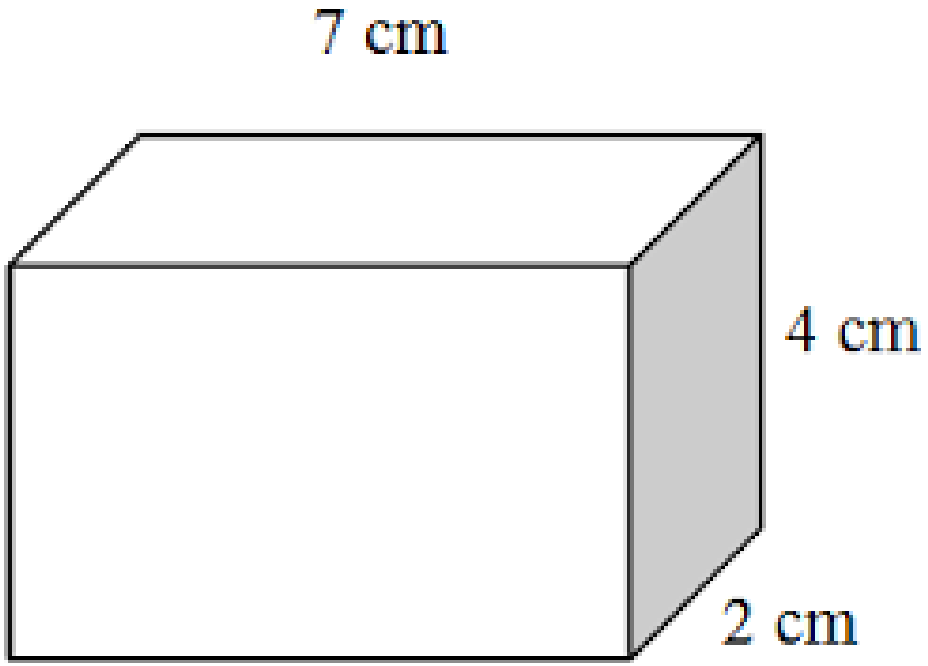
EXERCISE!

Find the surface area of the shapes:

1. All sides of a Rubik's cube measure 7cm .

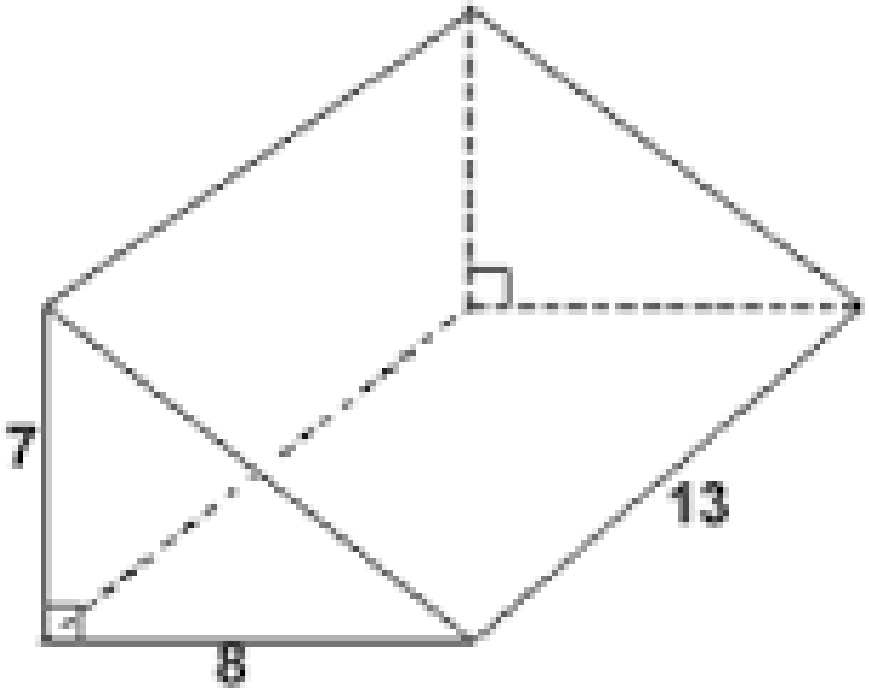


2.



EXERCISE!

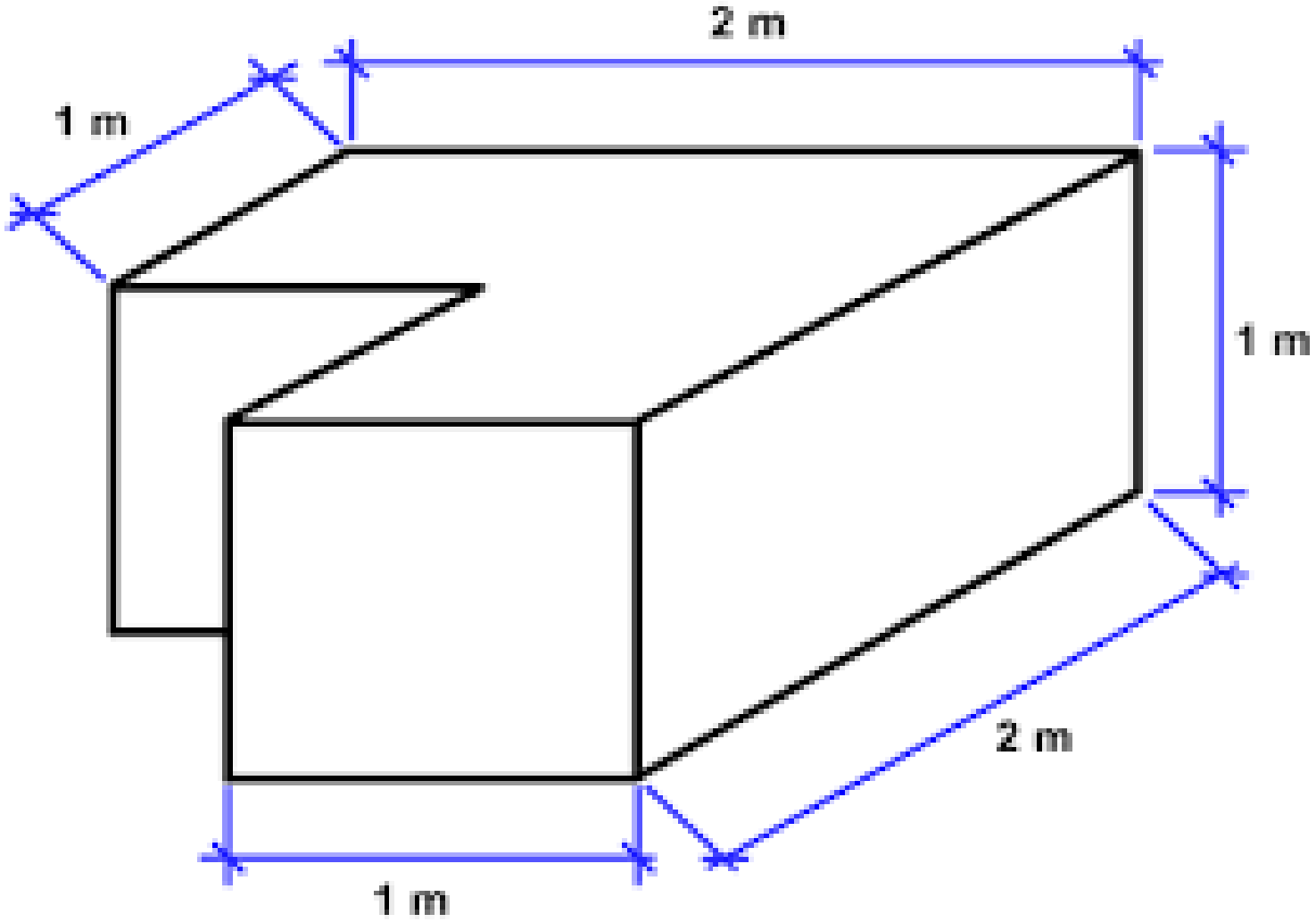
3



4. The diameter of the tin is 9cm and the height is 5cm

EXERCISE!

5.



VOLUME

Volume of a Triangular Prism & Cube

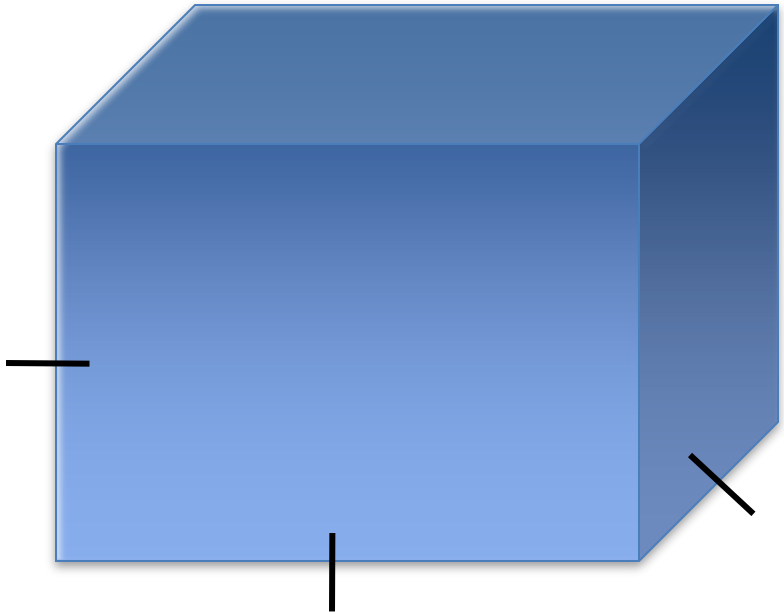
Volume of Prisms

Complex Volume Examples

VOLUME

Cube:

$V = (\text{side})^3$



side=3cm

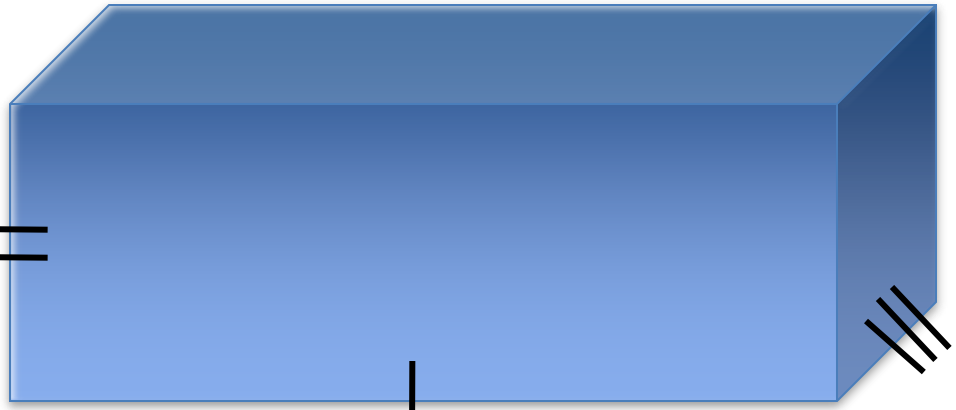
$\therefore V = (3)^3$

$= 27 cm^3$

VOLUME

Rectangular prism:

$V = l \times b \times h$



$\therefore V = 9 \times 5 \times 3$

$= 135mm^3$

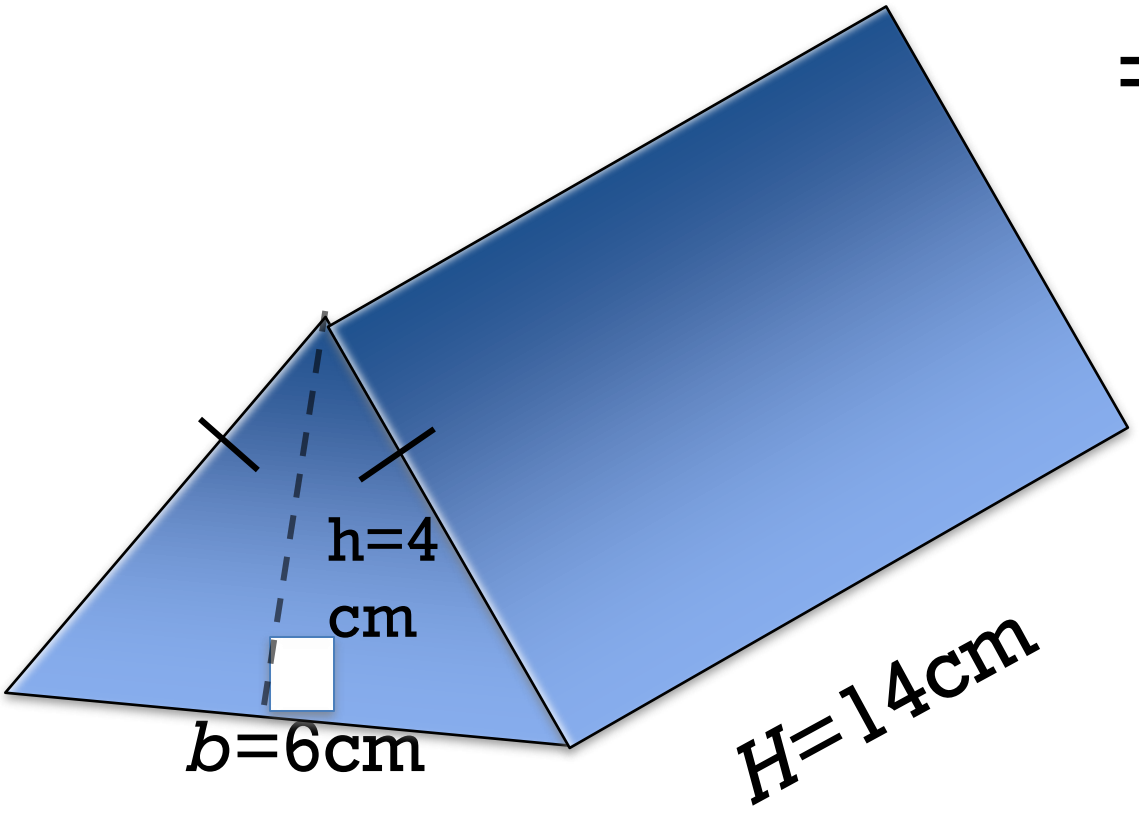
VOLUME

Triangular prism:

$V = \frac{1}{2} \times b \times h \times H$

$V = \frac{1}{2} \times 6 \times 4 \times 14$

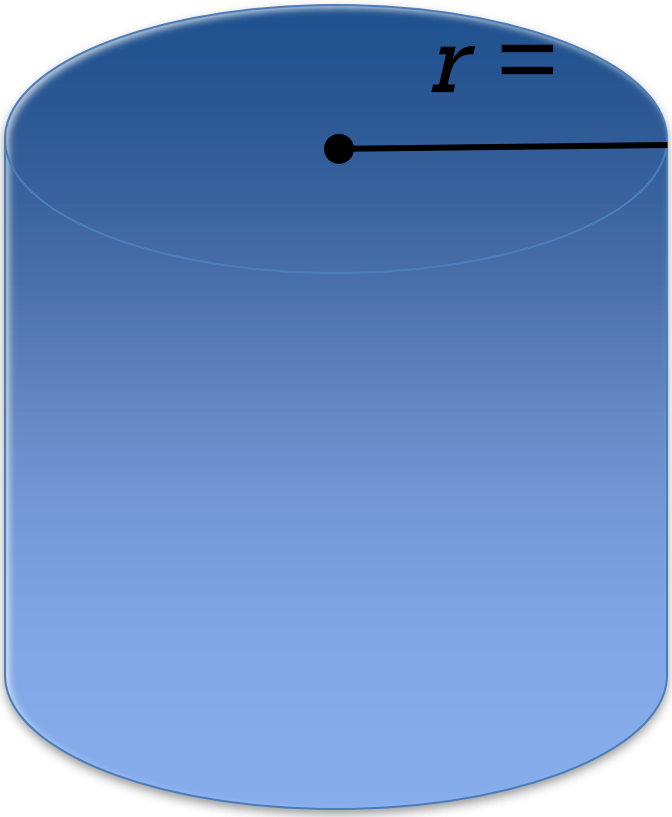
$= 168cm^3$



VOLUME

Cylinder:

$V = \pi r^2 \times h$



2mm

H=6mm

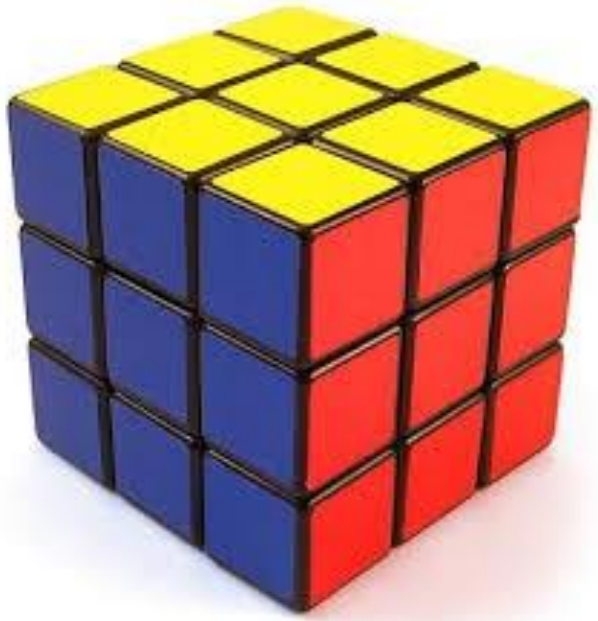
$\therefore V = \pi(2)^2(6)$

$= 75.40mm^3$

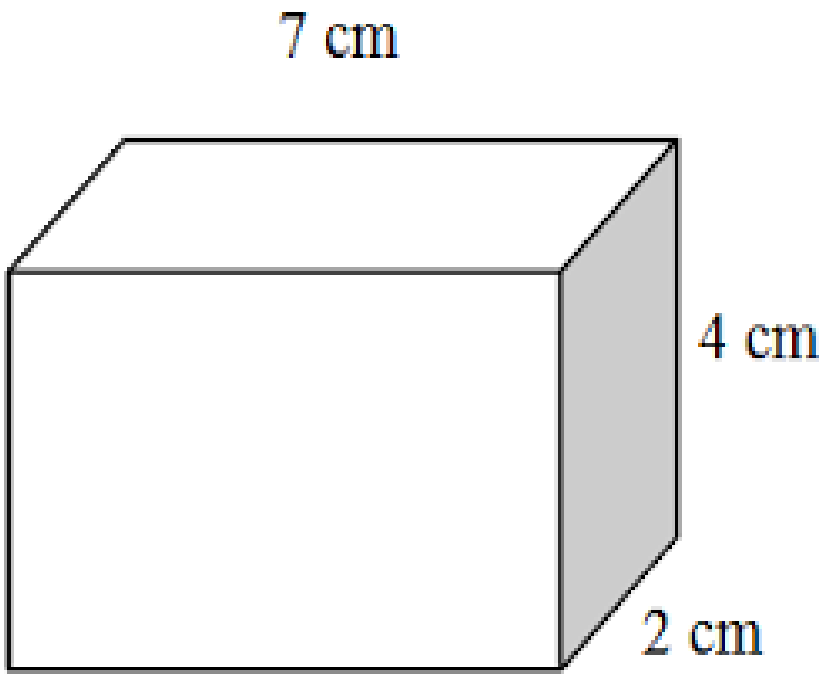
EXERCISE!

Find the volume of the shapes:

1. All sides of a Rubik's cube measure 7cm .

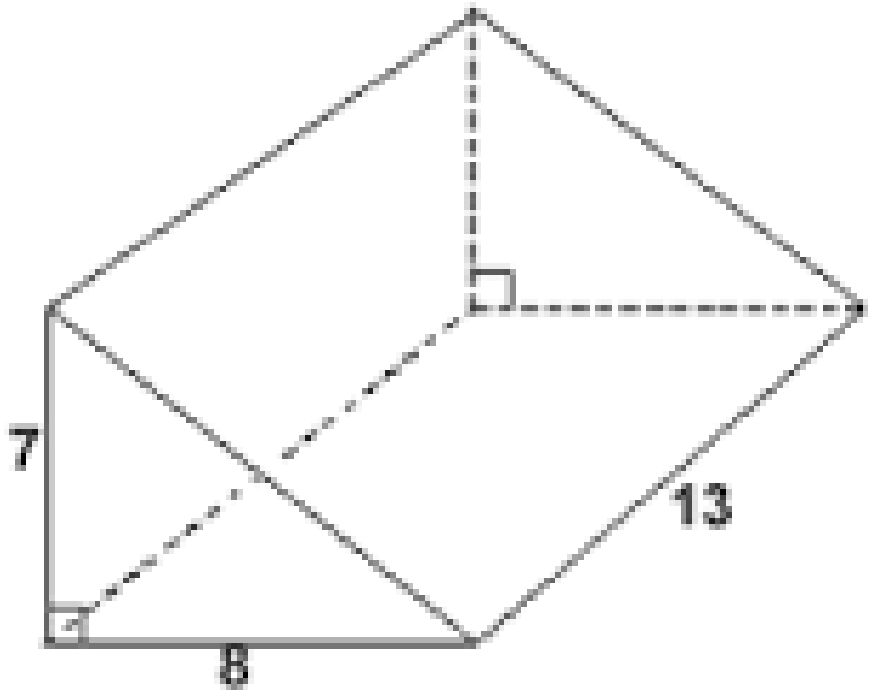


2.



EXERCISE!

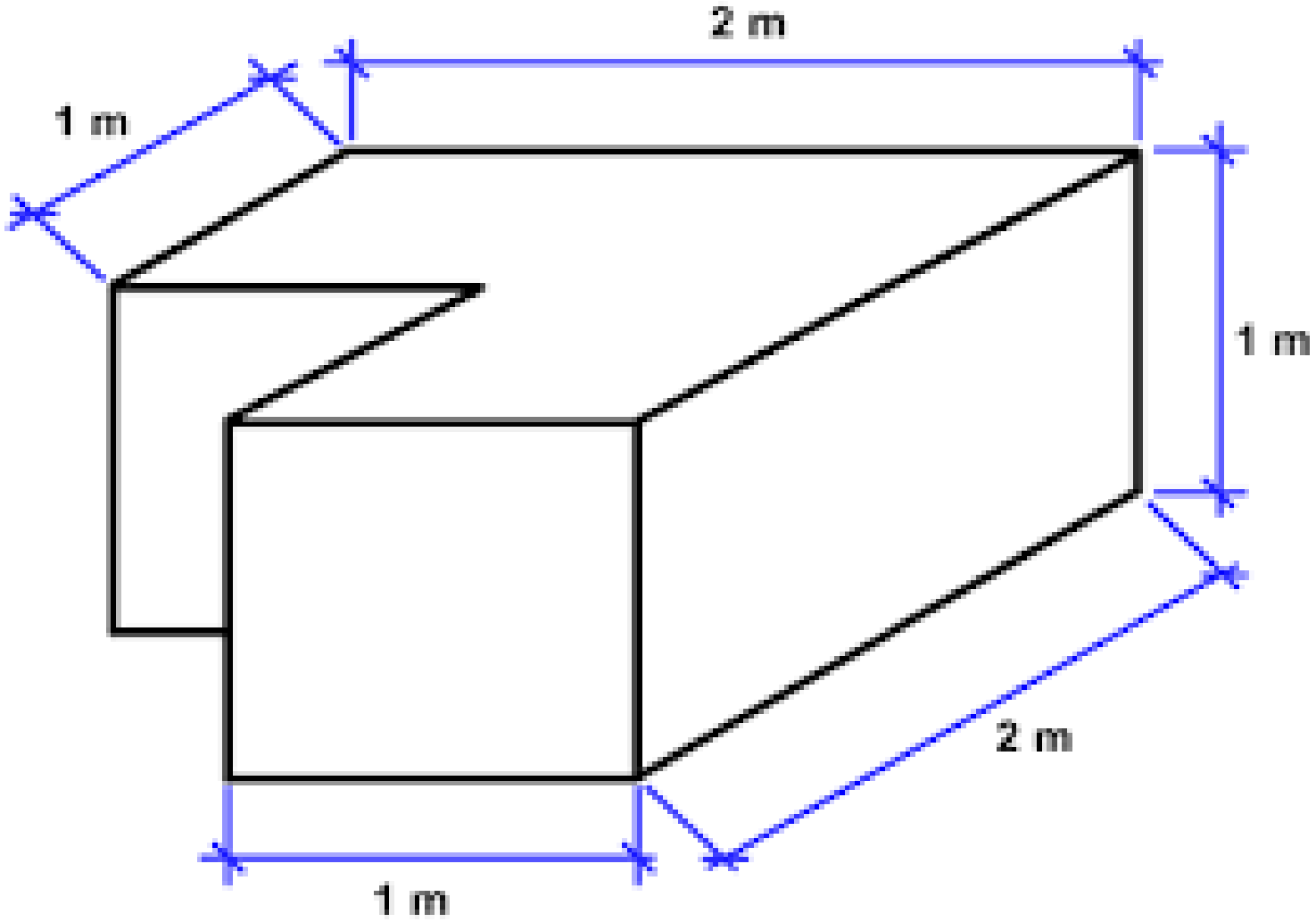
3.



4. The diameter of the tin is 9cm and the height is 5cm

EXERCISE!

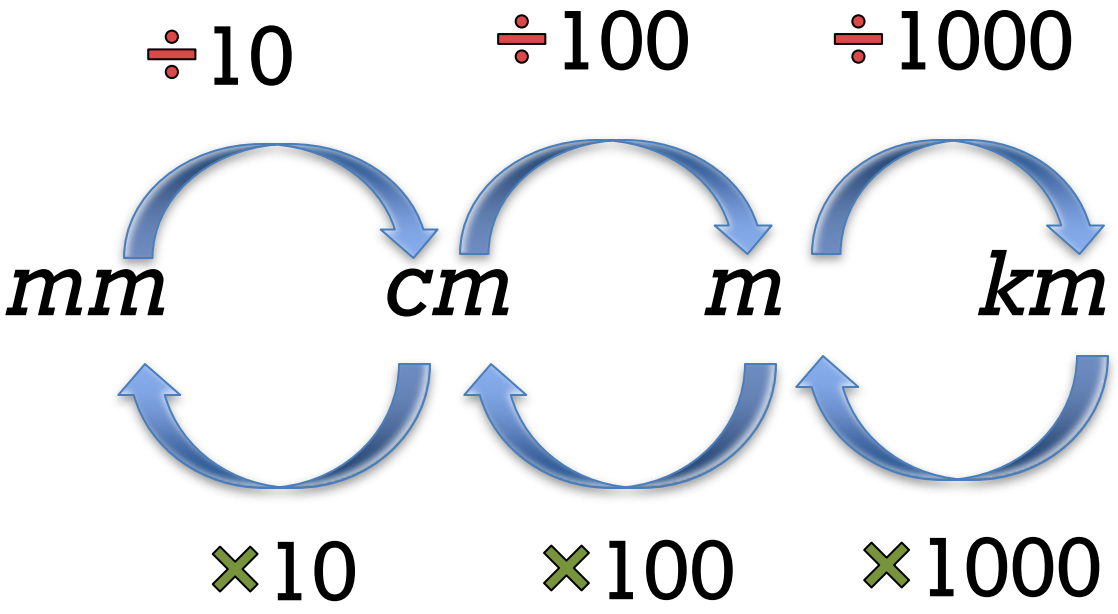
5.



CONVERSIONS

* Always make sure that all the dimensions are the same unit
* Learn and apply the following conversions:

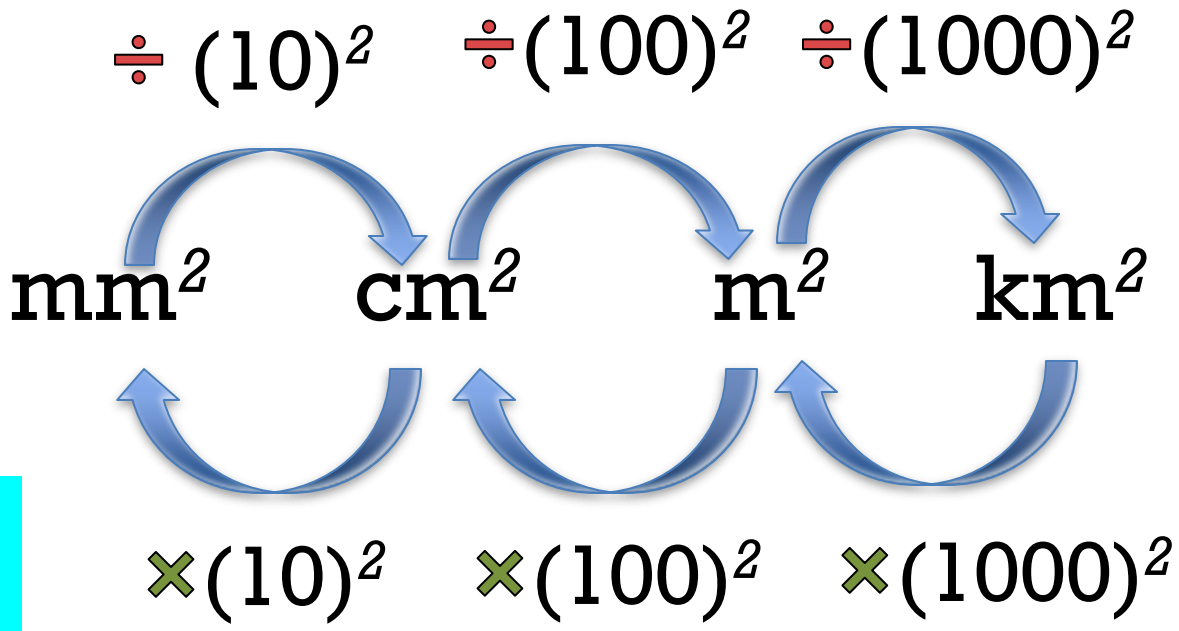
Perimeter:



Conversions with units of length

CONVERSIONS

Area:

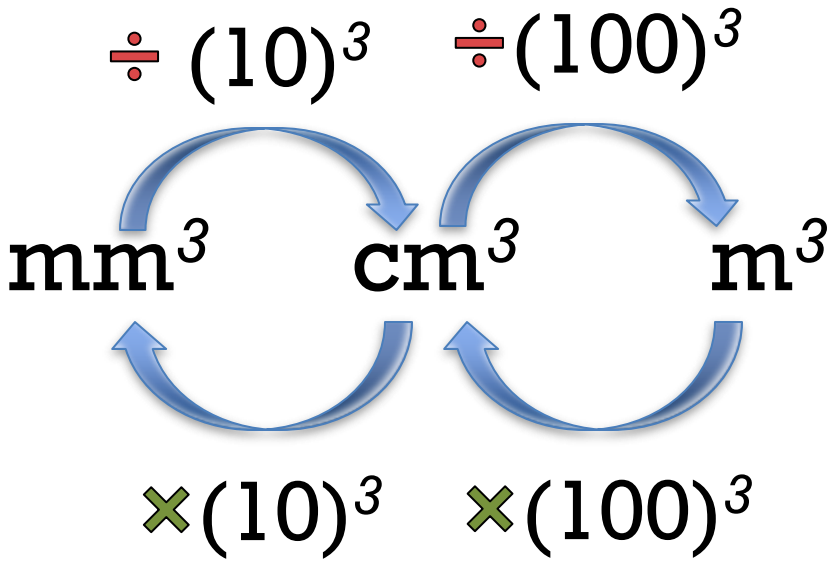


Conversions with units of area

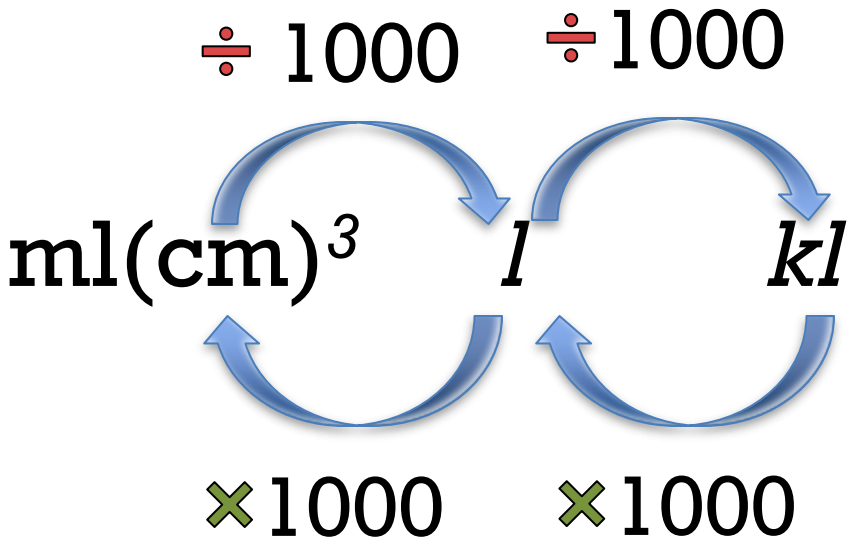
Since area is 2D shape, both lengths are converted ∴ *the scale factor is squared*

CONVERSIONS

Volume:



1ml=1cm³



Conversions with units of volume

EXERCISE!

1. $5cm \rightarrow m$
2. $23km \rightarrow m$
3. $16mm^2 \rightarrow cm$
4. $9m^3 \rightarrow cm$
5. $4cm \rightarrow m$
6. $3ml \rightarrow m$
7. $16cm^3 \rightarrow ml$
8. $29m^2 \rightarrow cm^2$