GENERAL MATHEMATICS 2

WEEK 10 NOTES & EXERCISES – TERM 3

Triangles

The formula for the area of a triangle is

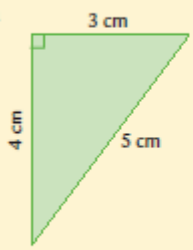
Area $= \frac{1}{2} \times$ base $\times$ height or $A = \frac{1}{2}bh$

The base and the height are always at right angles to each other.

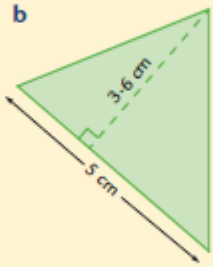
Example 4

What is the area of each of these triangles?

a



b



Solution 4

The formula is $A = \frac{1}{2}bh$.

a The base is 4 cm and the height is 3 cm. The base and the height are at 90°.

$A = \frac{1}{2} \times 4 \times 3 \text{ cm}^2$

$= 6 \text{ cm}^2$

b The base is 5 cm and the height is 3·6 cm. The base and the height meet at 90°.

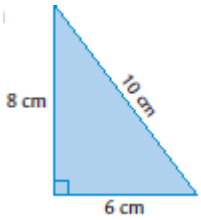
$A = \frac{1}{2} \times 5 \times 3{\cdot}6 \text{ cm}^2$

$= 9 \text{ cm}^2$

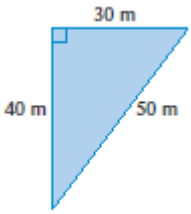
Exercise Set 1

Q1. Calculate the areas of these triangles. Remember to use the two dimensions that are at right angles to each other.

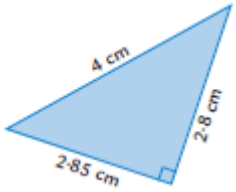
a)

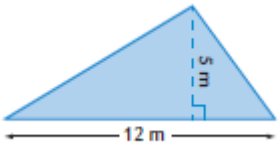


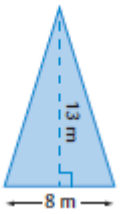
b)

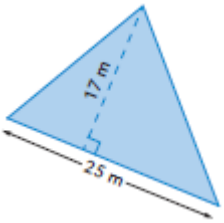


c)



d) 

e) 

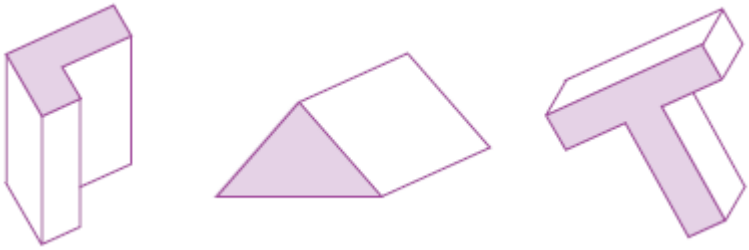
f) 

Q2. Alice wants to install sails over her children's play area to protect them from the sun. She plans to have three overlapping sails, each with a base of 4·5 m and a height of 6·2 m. Calculate the total area of the sails.

Prisms and volume

A prism has three dimensions – it is a **solid.** A prism often has a triangular or square face – but other shapes are possible. If the solid has a circular face it is called a cylinder.

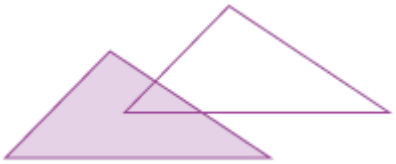
Sketching prisms



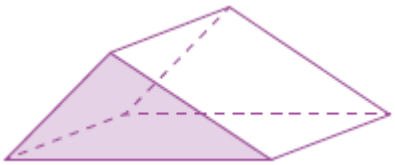
These solids are all prisms. Their cross-sections are shaded. The cross-section of a prism is the same all the way through.
It's easy to sketch prisms if you follow a few easy steps and use a ruler.

Step 1: Draw a plane shape; for example, a triangle.

Step 2: Draw an identical shape across and up from the first shape. Keep matching lines parallel.



Step 3: Join the matching angles with straight lines. Use dashed lines for edges that you can't actually see from outside.



Exercise Set 2

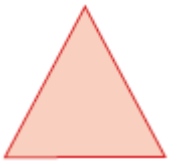
Q1. Follow the three steps above to construct prisms with these cross-sections, using the attached graph paper.

a)

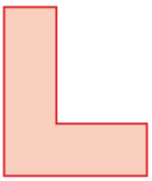
b)

c)

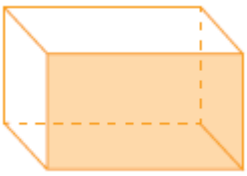
Q2. Draw three more prisms with these cross-sections (on the graph paper).

a) 

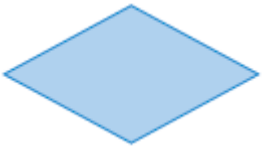
b)

c) 

Q3. You can alter the way a prism looks by altering the position of the second shape you draw, in step 2. In the first diagram of a rectangular prism, the second rectangle was drawn up to the left of the first rectangle. Use this technique to draw two prisms that look different, with the cross-sections in a) and b).

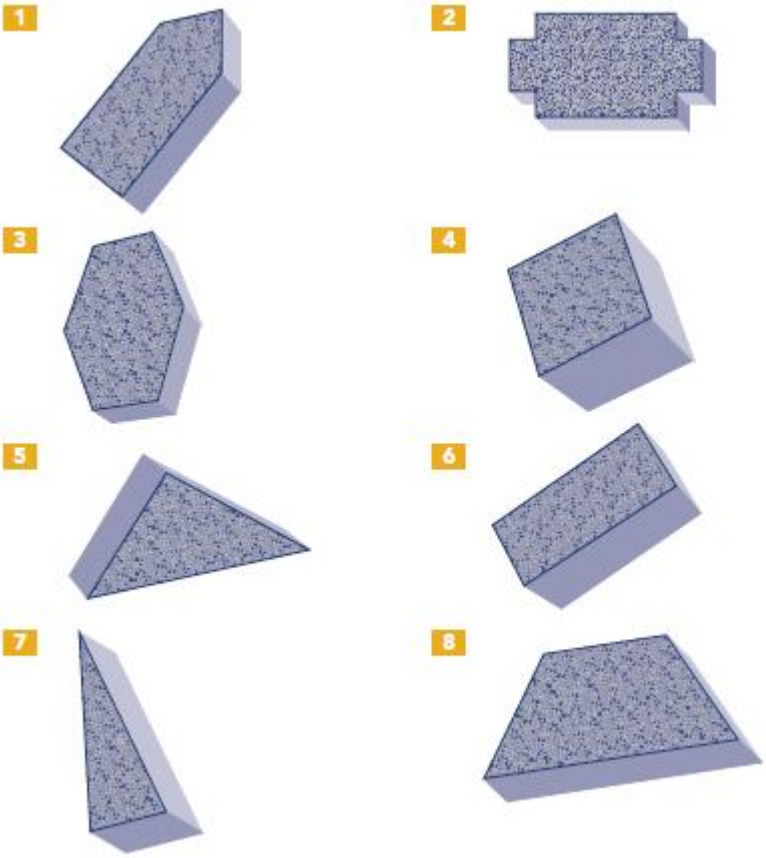


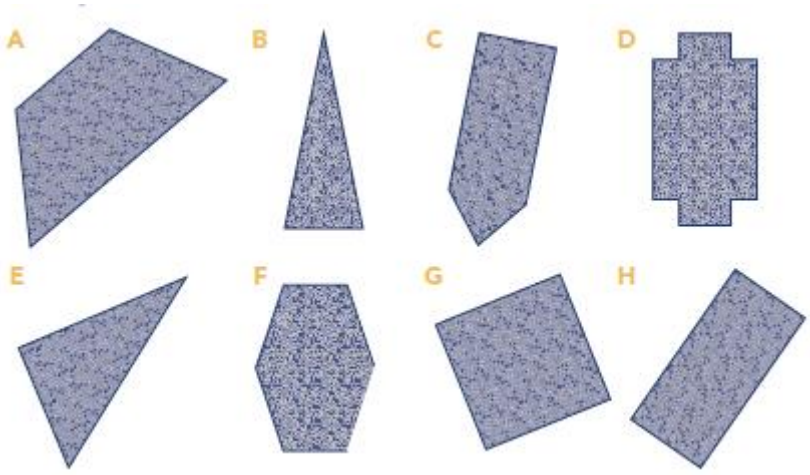
a)

b) 

Exercise Set 3.

Match the prisms in questions **1** to **8** with their cross-sections in **A** to **H** at the bottom of the page.





Volumes of regular prisms

The volume of a prism can be calculated with the formula:

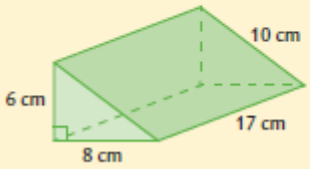
$$V = A \times H$$

where A = area of the cross-section

H = height at right angles to the cross-section.

Example 5

Calculate the volume of this triangular prism.



Solution 5

The cross-section of the prism is a triangle.

Area of triangle $= \frac{1}{2}bh$

$= \frac{1}{2} \times 6 \times 8 \text{ cm}^2$

$= 24 \text{ cm}^2$

Volume = area of triangle × height

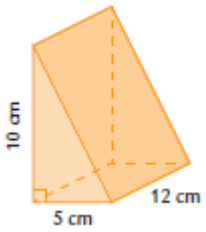
$= 24 \times 17 \text{ cm}^3$

$= 408 \text{ cm}^3$

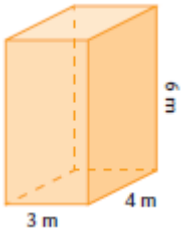
Exercise Set 4.

Q1. Calculate the volume of these solids.

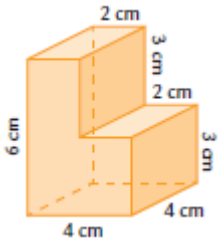
a)



b)



c)



Q2. Use the dimensions on the photographs to calculate the volumes of these boxes of chocolate.

a)

b)