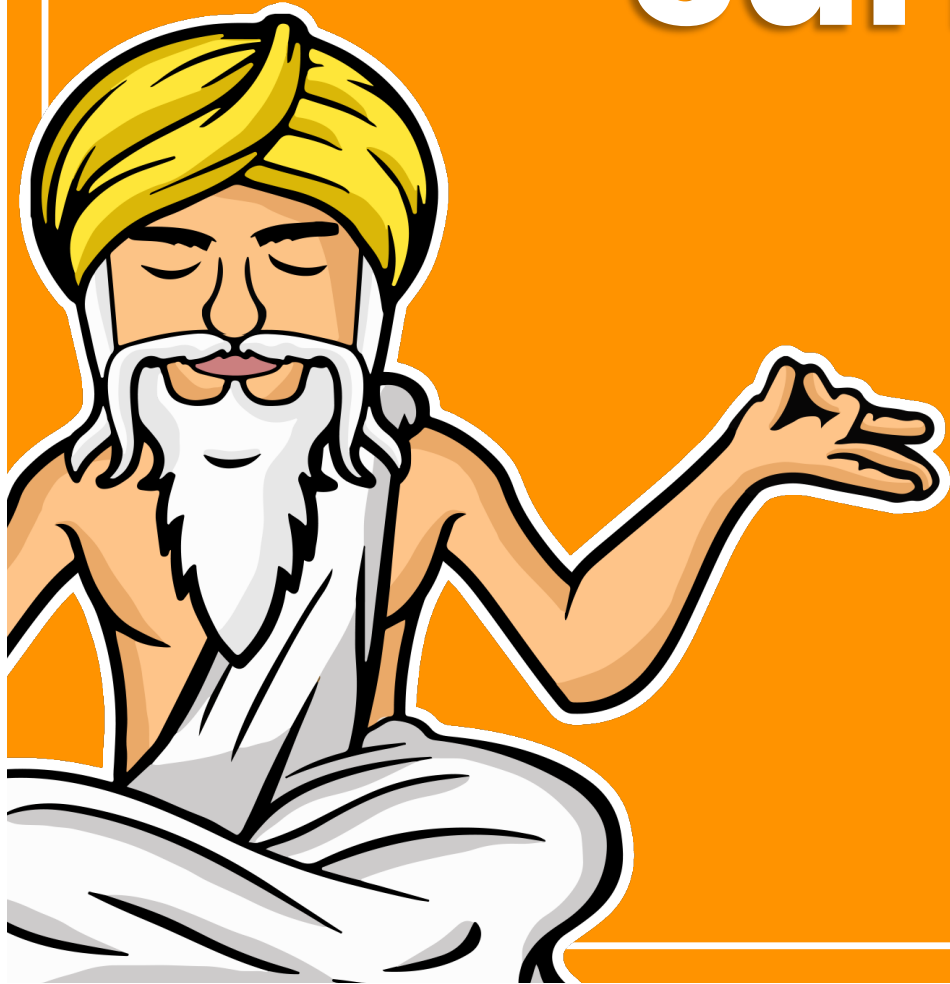




Surface area of a prism



Year 8 Mathematics

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Learning Objectives

By the end of the lesson I would hope that you have an understanding and be able to apply to questions the following concepts:

- Understand what a surface area is
- Understand what a net is
- Understand what a prism is
- Know how to find the surface area of a prism

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Recap

This lesson builds on the work which has been covered previously on

- Length and perimeter
- Circumference of a circle
- Area of basic shapes
- Area of kites, rhombuses and trapeziums

It is really important to understand that areas and volumes form a significant part of the Mathematics course. We even use it at VCE! Understanding how to find areas, and where the formulae came from is really helpful.

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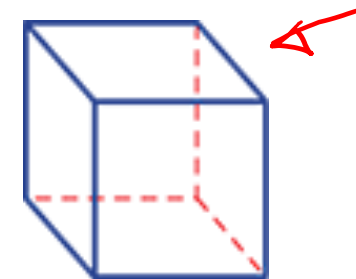
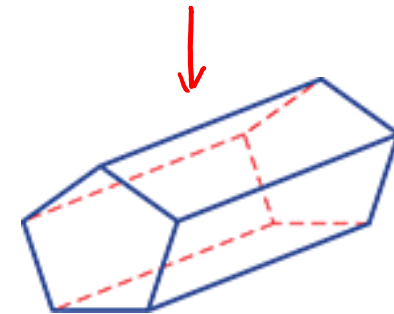
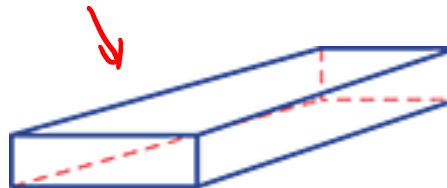
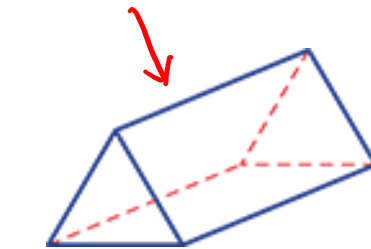
What is a prism?

Prisms are defined in the following way (according to Wikipedia)

In geometry, a prism is a polyhedron comprising an n -sided polygonal base, a second base which is a translated copy (rigidly moved without rotation) of the first, and n other faces (necessarily all parallelograms) joining corresponding sides of the two bases. All cross-sections parallel to the bases are translations of the bases. Prisms are named for their bases, so a prism with a pentagonal base is called a pentagonal prism. The prisms are a subclass of the prisms.

Confusing Much?!

Here are some examples of prisms .



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What is a prism?

I like to think of prisms as shapes which, when we put it through a bread cutting machine (in a certain way) all the slices will come out looking the same.

They will have a **uniform cross section**.



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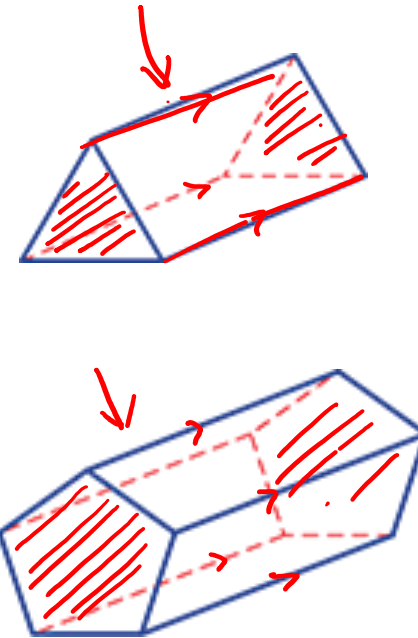


Image source: commons.wikipedia.com
Image source: Cambridge Essentials Year 8 Textbook

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Who is Annette?

Cheap Dad joke coming ...

Annette Hamilton (born 1945) is a leading Australian born and based cultural anthropologist and senior fellow of the Australian Anthropological Society who first undertook significant fieldwork, appeared as an expert in land rights claims, and published on Aboriginal Australian peoples of the Northern Territory plus remote South Australia, later specializing and becoming a key practitioner lecturing and publishing on the visual anthropology of media in Southeast Asia[1]



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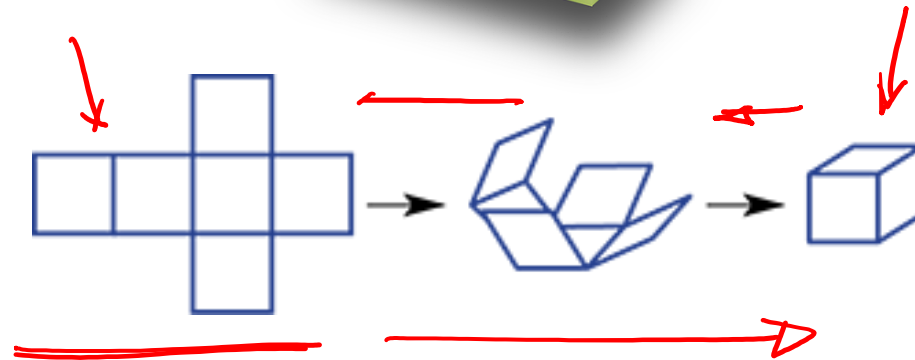
*Extract from: Image source: wikipedia.com
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What is a net?

Take a cereal box and flatten it out and you have a net.

It's a two-dimension representation of all the surfaces of a solid.



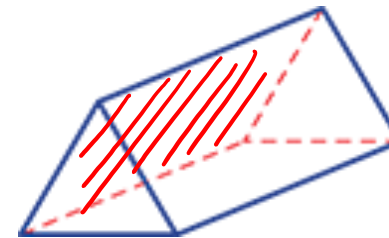
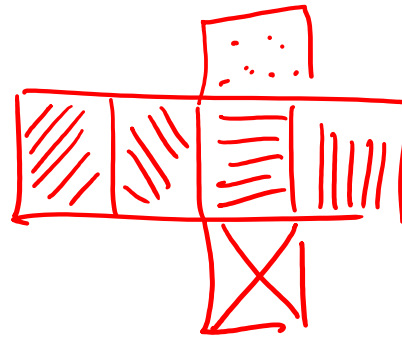
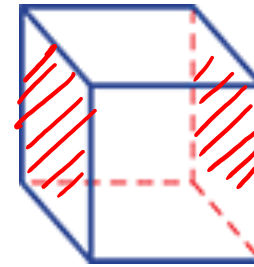
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Finding the surface area of a prism

You need to find the area of each **face** of the prism.

This will require a number of calculations of area; one for each side.

Once you have each side, you add them together for the total surface area.



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Examples

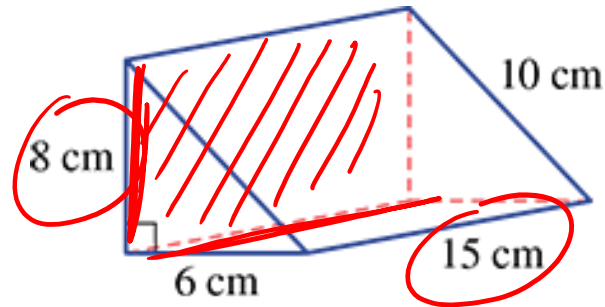
Find the surface area of this prism.

$$\begin{array}{r} 360 \\ + 48 \\ \hline 408 \end{array}$$

$$\begin{aligned} A_{\text{FRONT}} &= \frac{1}{2} \times 6 \times 8 \\ &= 3 \times 8 \\ &= \underline{\underline{24 \text{ cm}^2}} \end{aligned}$$

$$\begin{aligned} A_{\text{BASE}} &= 6 \times 15 \\ &= \underline{\underline{90 \text{ cm}^2}} \end{aligned}$$

$$\begin{aligned} A_{\text{SLANT}} &= 10 \times 15 \\ &= 150 \text{ cm}^2 \end{aligned}$$



$$\begin{aligned} A_{\text{BACK}} &= 8 \times 15 \\ &= \underline{\underline{120 \text{ cm}^2}} \end{aligned}$$

$$A_F = 24$$

$$A_B = 24$$

$$A_{\text{BASE}} = 90$$

$$A_{\text{SL}} = 150$$

$$A_{\text{BACK}} = 120$$

$$\therefore \text{Total SA} = \underline{\underline{408 \text{ cm}^2}}$$

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Examples have been extracted, with permission, from
the Cambridge Essential Mathematics (Year 8) Textbook

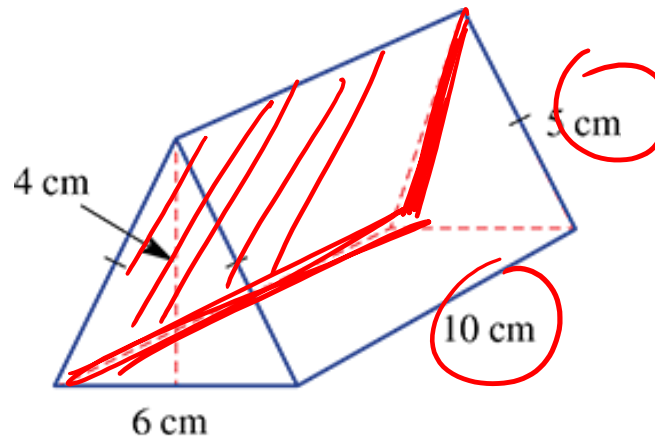
Examples

Find the surface area of this prism.

$$\begin{aligned} A &= \frac{1}{2}bh \\ &= \frac{1}{2} \times 6 \times 4 \\ &= 12\text{cm}^2 \end{aligned}$$

$$\begin{aligned} A &= 6 \times 10 \\ &= 60\text{cm}^2 \end{aligned}$$

$$\begin{aligned} A &= 10 \times 5 \\ &= 50\text{cm}^2 \end{aligned}$$



$$\begin{aligned} SA &= 12 \\ &+ 12 \\ &+ 60 \\ &+ 50 \\ &+ 50 \end{aligned}$$

$$\therefore \text{TSA} = \underline{\underline{184\text{cm}^2}}$$

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