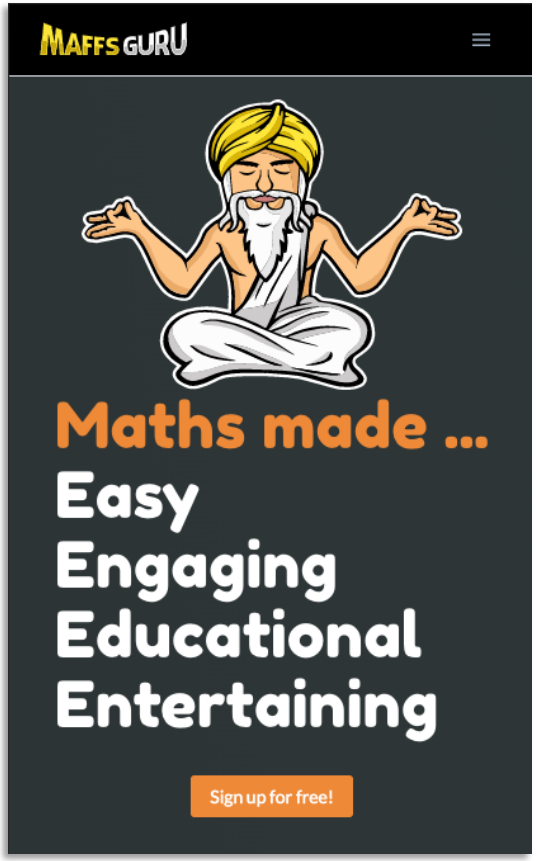
Surface area of prisms and pyramids



Year 9 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 is meant by surface area of a solid
- Know how many surfaces there are on a three-dimensional shape (or net)
- Find the surface are of a prism or pyramid

Recap

It doesn't feel like long ago that we covered the same content area. Finding the surface area of a prism simply requires you to find the area of each face of a prism and then add them together.

We have looked at finding the areas of basic shapes such as those shown. Most prisms will have one (or all) of these shapes as one (or all) of it's faces.

The only real difference with this particular video is we are now going to look at pyramids.

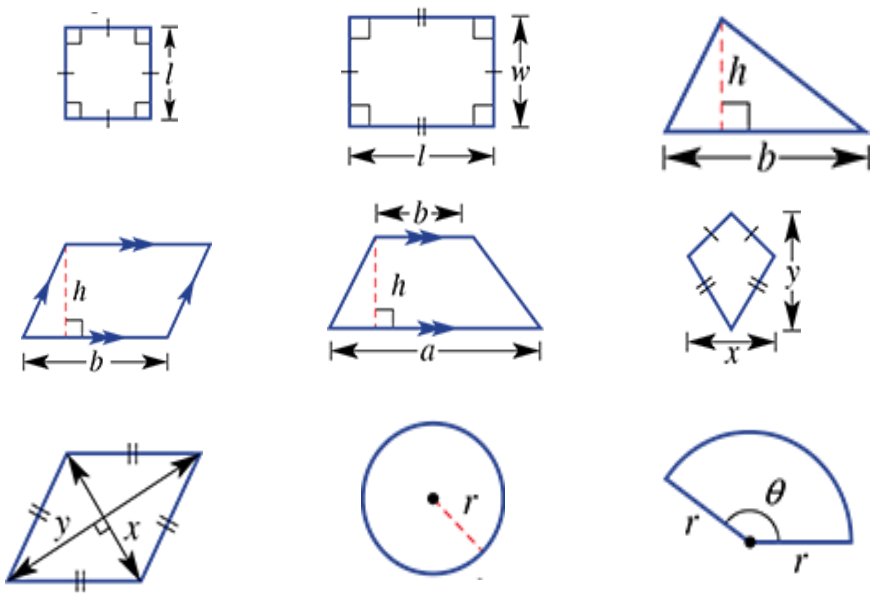


Image source: Cambridge Essentials Year 9 Textbook

Something for the bucket list

I have always wanted to visit the Great Pyramid of Giza.



Image source: Google images

Something for the bucket list

However, I am led to believe that it will require a lot of time spent on the back of a camel.

I've spent a short amount of time on the back of a horse, and that wasn't any fun at all.

Being stuck between two humps … I don't think so!



Image source: Google images

Camels spit … you know …



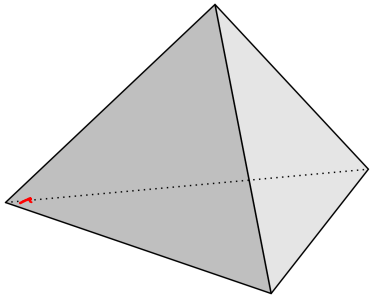
They aren't actually spitting, though—it's more like throwing up! They bring up the contents of their stomach, along with saliva, and project it out. This is meant to surprise, distract, or bother whatever the **camel** feels is threatening it. You can tell if a **camel** is about to **spit**: its cheeks fill up and bulge.

Image and text source: San Diego zoo website

Back to pyramids ...

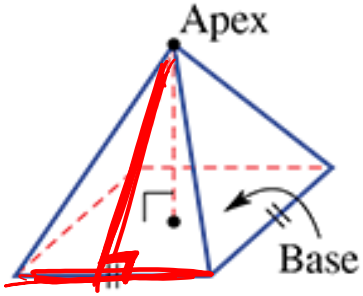
There are two main types of pyramid which we generally deal with in Mathematics; right square based and triangular based

Notice the use of the language.: Apex.

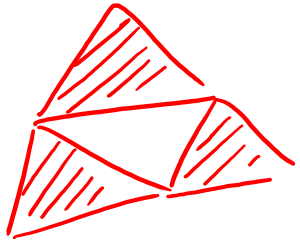


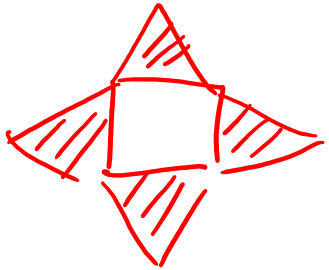
Base
1 side x 3

Triangular based pyramid



Right square-based pyramid





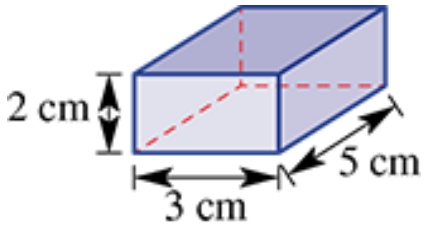
Base
1 Triangle x 4

Image source: Cambridge Essentials Year 9 Textbook
Image source: Wikipedia commons

Recap of finding the surface area of a prism

Remember this is surface area and not volume.
You must find the area of each surface of the prism and add them all together. Remember to show all your working.

Find the total surface area of this right rectangular prism and this right square-based pyramid.



$F = 2 \times 3 = 6\text{ cm}^2$

$B = 2 \times 3 = 6\text{ cm}^2$

$T = 3 \times 5 = 15\text{ cm}^2$

$\text{Base} = 3 \times 5 = 15\text{ cm}^2$

$\text{Side} = 2 \times 5 = 10\text{ cm}^2$

$\text{Side} = 2 \times 5 = 10\text{ cm}^2$

12 + 30 + 20

$\therefore TSA = 62\text{ cm}^2$

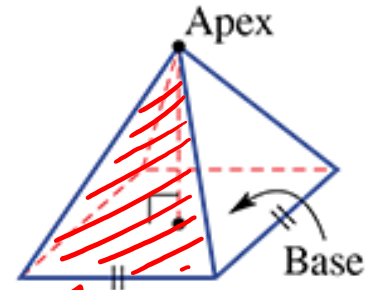
Image source: Cambridge Essentials Year 9 Textbook

Examples have been extracted, with permission, from the Cambridge Essential Mathematics (Year 9) Textbook

Finding the surface area of a pyramid

The great thing about pyramids is that they (generally) have a base which has one set of measurements and four sides (triangles!) which all have the same dimensions.

Hence, find the area of the base and one of the triangles and you have the components to work out the surface area.



Area = $\frac{1}{2}$ x Base x Height

Image source: Cambridge Essentials Year 9 Textbook

Examples have been extracted, with permission, from the Cambridge Essential Mathematics (Year 9) Textbook

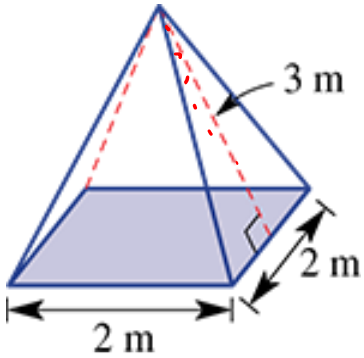
Example of finding the surface area of a pyramid

Find the total surface area of this right rectangular prism and this right square-based pyramid.

Important: Notice that they are giving you the **slant height** of the pyramid. This is very useful.

The length of one of the sides isn't actually as useful as it looks!

Remember: The area of a triangle requires **base length** and **perpendicular height**.



$\text{Area}_{\square} = 2 \times 2 = 4\text{m}^2$

$\text{Area}_{\Delta} = \frac{1}{2} \times 2 \times 3 = 3\text{ m}^2$

$\therefore \text{TSA} = 4 + 4 \times 3$

$= 4 + 12$

$= 16\text{m}^2$

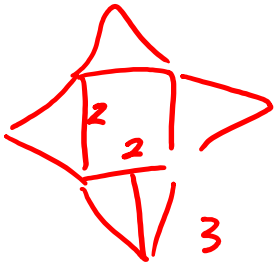


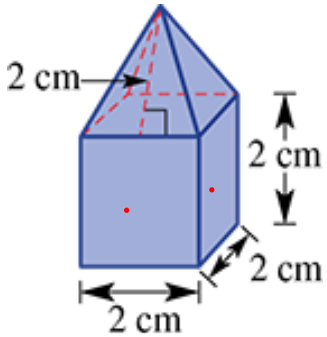
Image source: Cambridge Essentials Year 9 Textbook

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Gotchas

Maths is trying to trick you. We are trying to test your understanding and not your ability to regurgitate a formula.

Let's consider the following shapes:



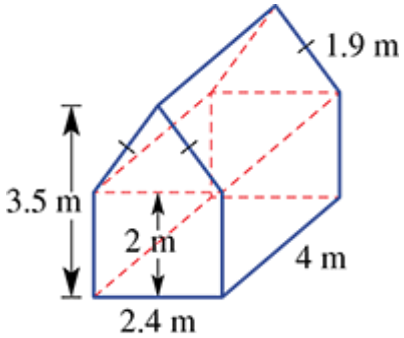


Image source: Cambridge Essentials Year 9 Textbook

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Questions to complete

Here are the questions I ask that you complete and upload to my OneNote. You are always welcome to do more questions if you feel that would improve your understanding.

If you are unsure, at any time, please email me. You can ask questions in the lessons.

Year 9 textbook
Exercise 5E
Questions: 2b, 3b, 4bcef, 6, 7, 8, 10, 12bce

Thanks for watching

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