

Calculate the Surface Areas of Prisms, Cylinders (& Pyramids – H) – SS7

Surface area is the total area of all the outer surfaces of the object. If you were painting it, it's all the sides you would paint.

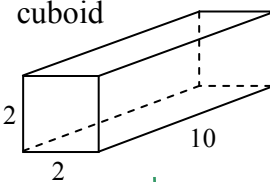
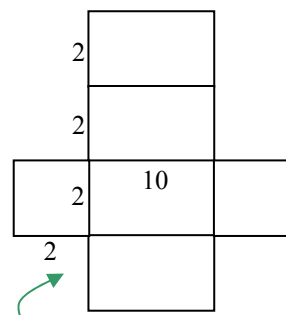
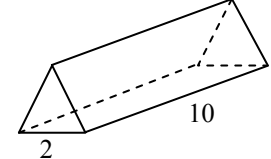
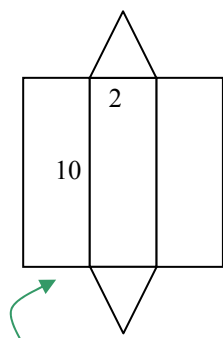
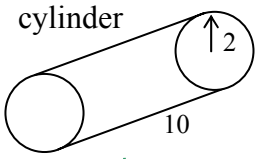
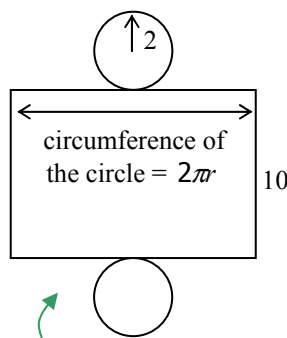
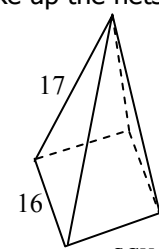
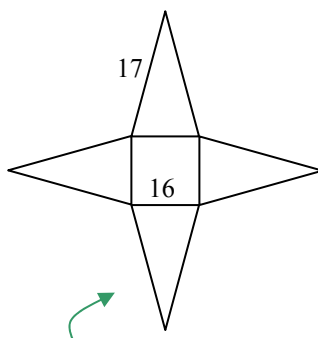
Strategy

1. Consider the outer surface or draw the net if this helps
2. Look for faces of the same size and shape
3. Find the area of each different face
4. Total together the areas to find the surface area of the solid

surface area of the shape can often be the area of the net

A net is the surfaces of a solid shape folded out flat

The nets of the following 3D shapes have been drawn, and the individual shapes that make up the nets listed:

| | | | |
|--|---|--|---|
| <p>cuboid</p>  <p style="text-align: center;">↓</p>  <p>2 small rectangles 4 large rectangles</p> | <p>triangular prism</p>  <p style="text-align: center;">↓</p>  <p>2 triangles 3 rectangles</p> | <p>cylinder</p>  <p style="text-align: center;">↓</p>  <p>1 rectangle 2 circles</p> | <p>square-based pyramid</p>  <p style="text-align: center;">↓</p>  <p>1 square 4 triangles</p> |
|--|---|--|---|

Example

What is the surface area of the cylinder above?

Solution

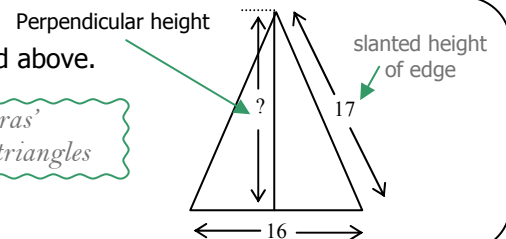
Starting at stage 3 of the strategy:

3. Area of circle = $\pi r^2 = \pi \times 2^2 = 4\pi$
Area of rectangle = $2\pi r \times h = 2 \times \pi \times 2 \times 10 = 40\pi$
4. $2 \times 4\pi + 40\pi = 48\pi$ units² or 151 units² to 3 s.f.

Your Turn!!

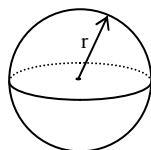
Find the surface area of a) the cuboid and b) the square-based pyramid above.

Hint b) You will need to use Pythagoras' theorem to work out the height of the triangles



The Surface Area (and Volume) formula for Cones and Spheres are given on the formulae sheet for higher students – see NA4.

Volume of Sphere = $\frac{4}{3}\pi r^3$



Volume of Cone = $\frac{1}{3}\pi r^2 h$



Surface Area of Sphere = $4\pi r^2$

Curved Surface Area of Cone = $\pi r l$

RAPID 'ACID' TEST – Blank out the page above before answering these!

1. Find the Surface Area of the two solid shapes:
Give your answer to ii) to 3s.f. **and** exactly in terms of π .

