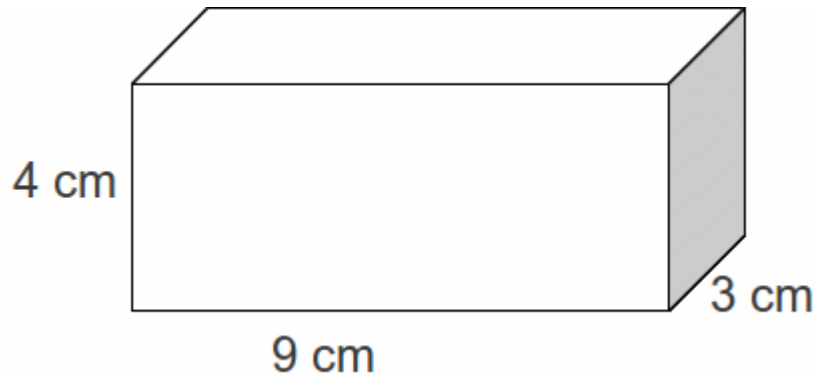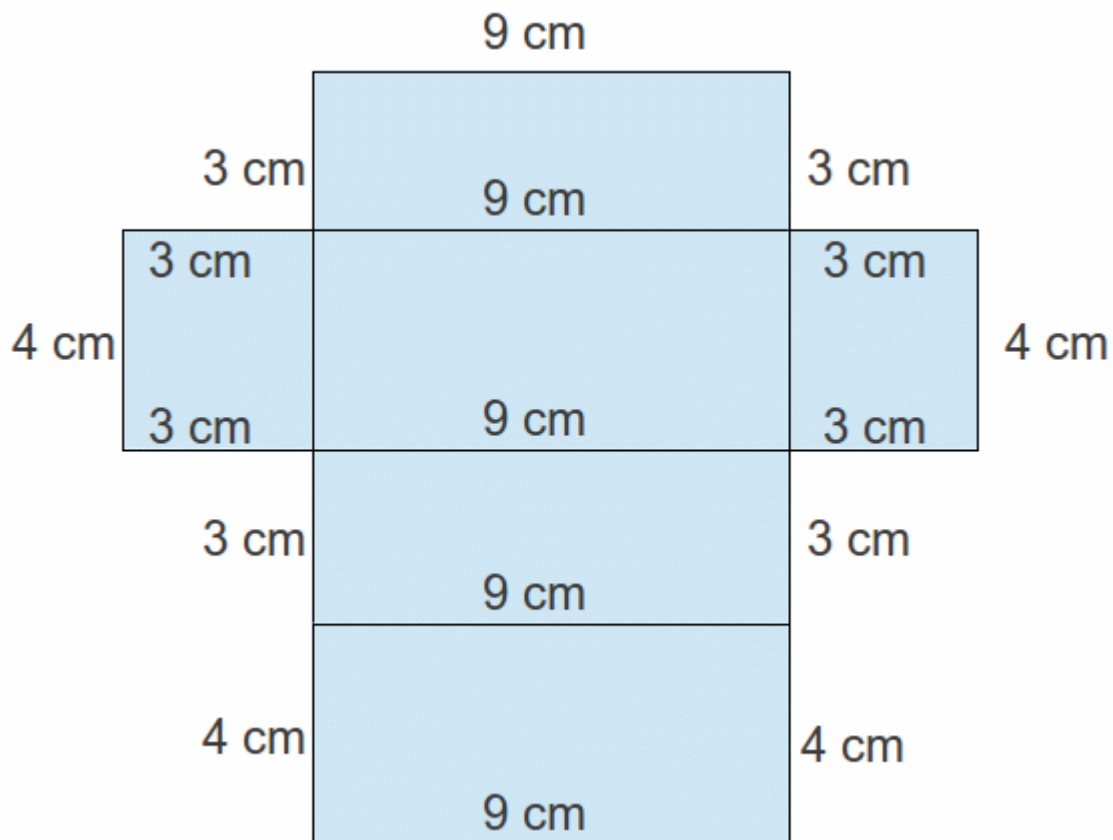# Nets and Surface Areas

To find the surface area of a solid shape, we should often first draw the net of the solid. This involves 'unfolding' the solid onto a flat surface and finding the areas of individual parts of the net, which are often simple shapes like rectangles, squares, triangles and circles.
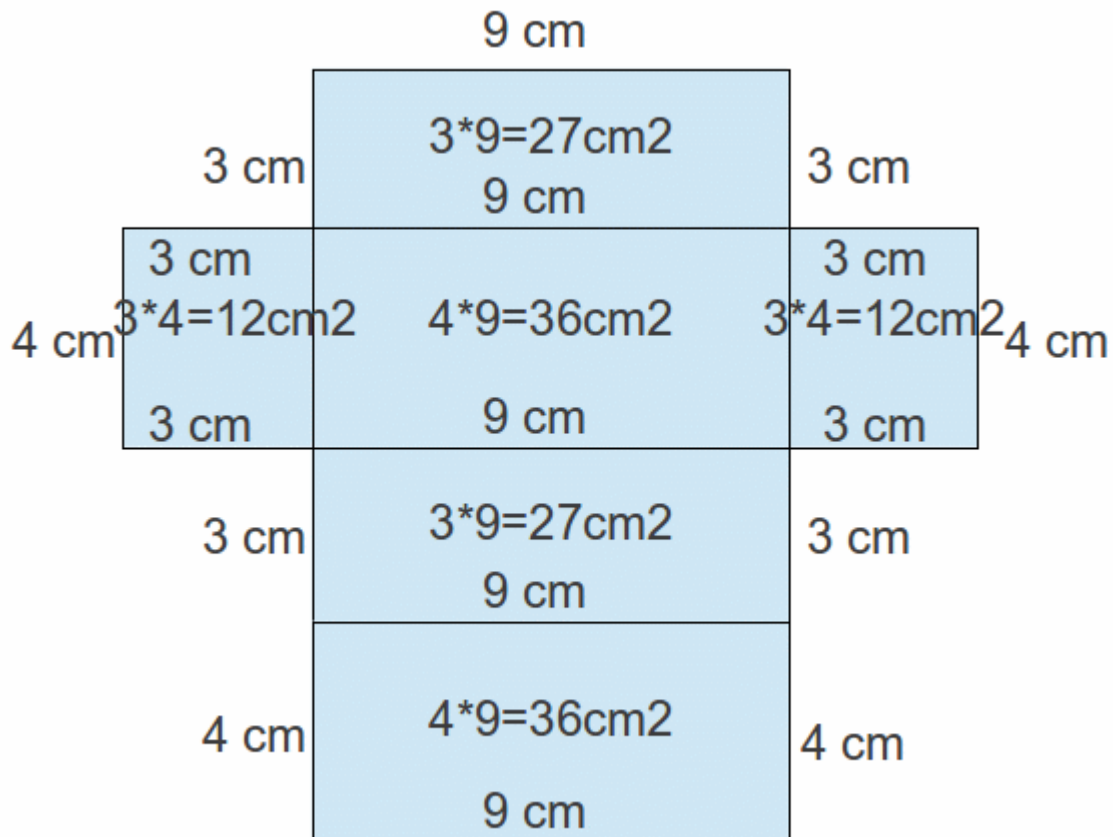
To find the area of the cuboid below,

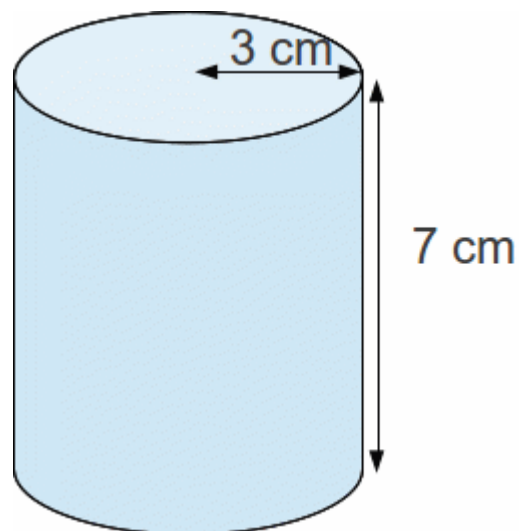draw the net, with the length of each side, which looks like

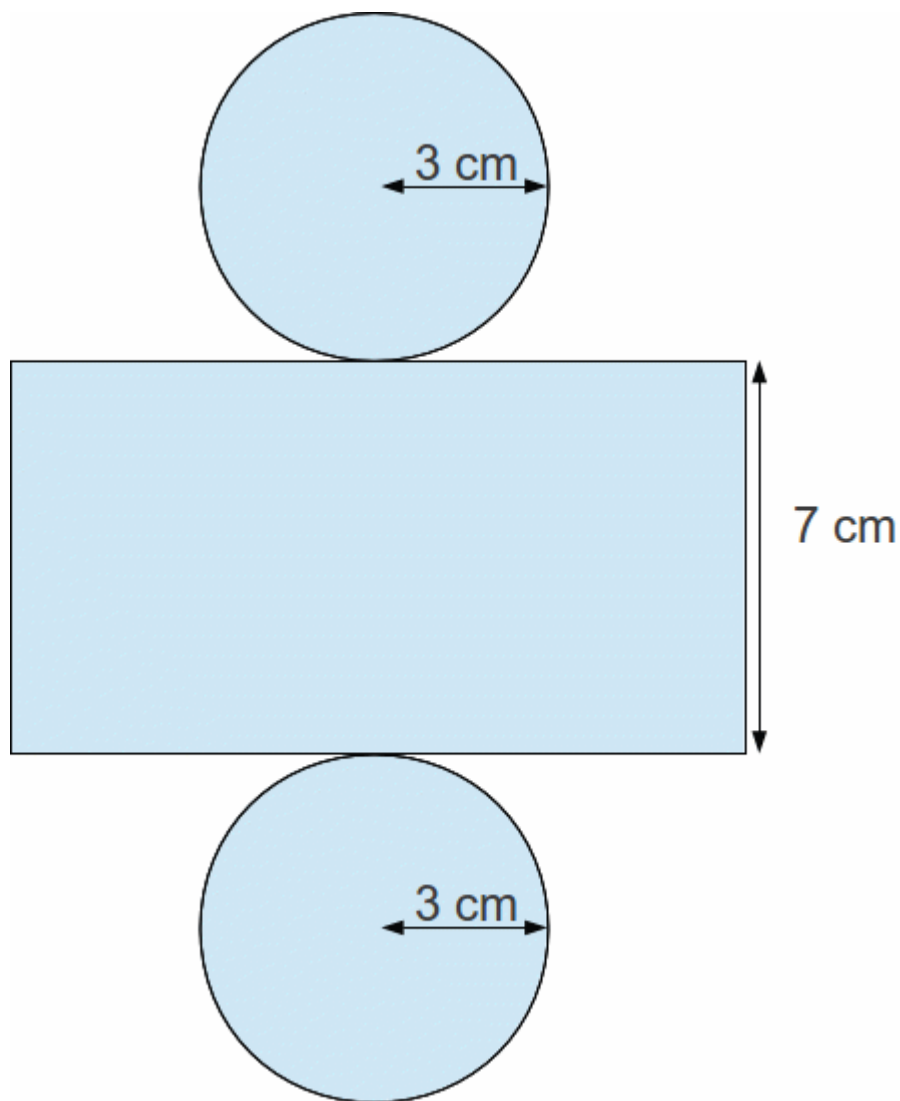The area is then easily calculated as shown below.

9 cm

| | 3*9=27cm2 | |
| 3 cm | 9 cm | 3 cm |

3 cm   3 cm
4 cm 3*4=12cm2   4*9=36cm2   3*4=12cm2 4 cm

3 cm   9 cm   3 cm

3 cm   3*9=27cm2   3 cm
9 cm

4 cm   4*9=36cm2   4 cm
9 cm

The total area is the sum of the individual areas: $A=27+36+27+36+12+12=150\text{cm}^2$.
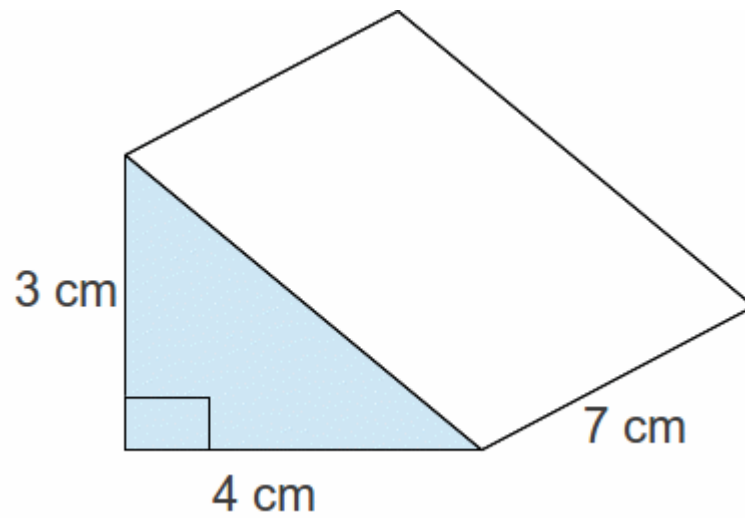
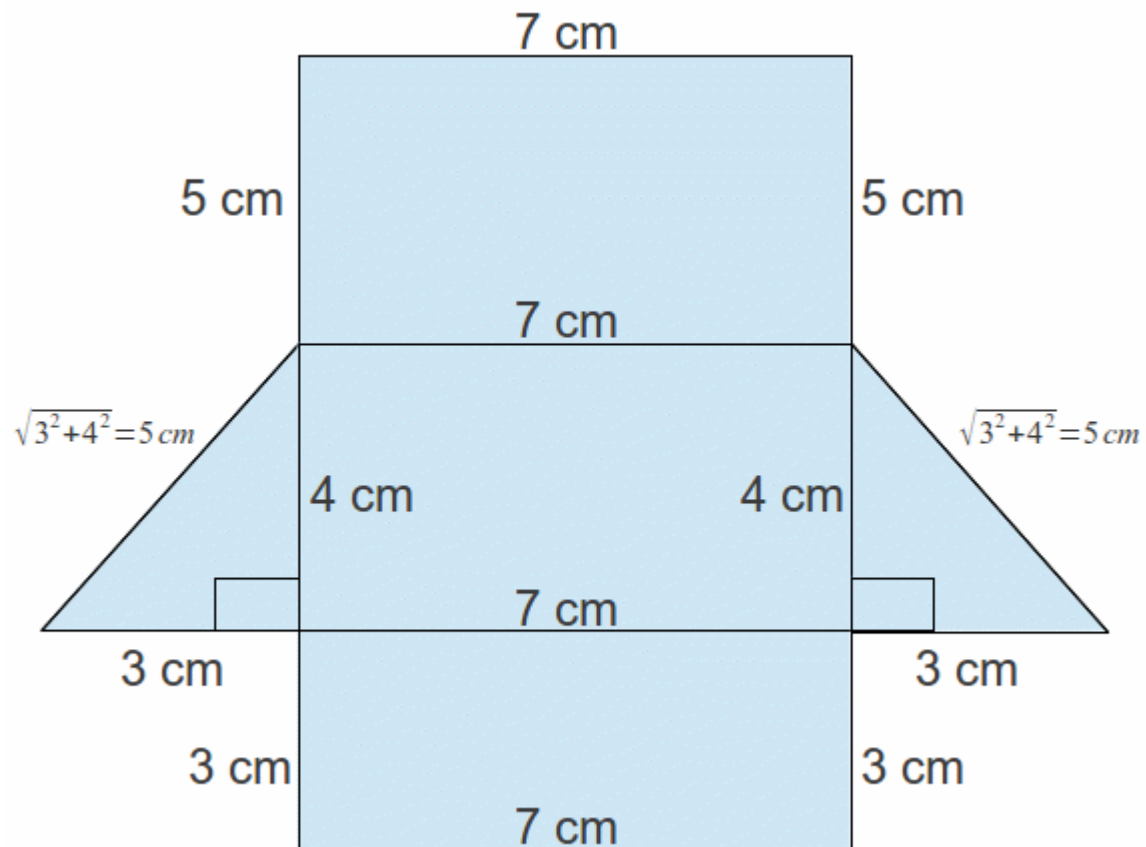To find the surface area of the cylinder below,

3 cm

7 cm

Draw the net, shown below.

The area of each circle is $\pi*3^2=9\pi\,units^2$.

The base of the curved surface, shown above as a rectangle, is equal to the circumference of the circle, so the area of the rectangle is $(2\pi*3)*7=42\pi\,units^2$ and the total surface area is $2*9\pi+42\pi=80\pi\,units^2=188.50\,units^2$.

To find the surface area of the right angled triangular prism below,
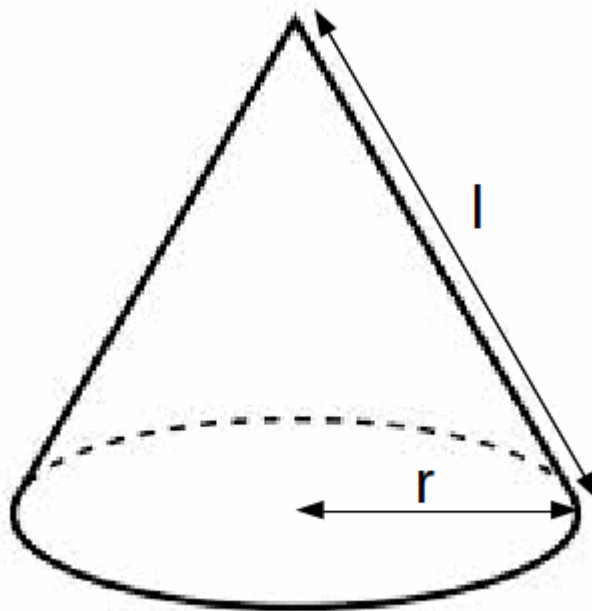
3 cm

4 cm

7 cm

draw the net, shown below.

7 cm

5 cm

5 cm

7 cm

$\sqrt{3^2+4^2}=5\,cm$

$\sqrt{3^2+4^2}=5\,cm$

4 cm

4 cm

7 cm

3 cm

3 cm

3 cm

3 cm

7 cm

The area of each shape is shown below.

7 cm

5 cm   5*7=35cm²   5 cm

7 cm

$\sqrt{3^2+4^2}=5\,cm$ 4 cm   4*7=28cm²   4 cm $\sqrt{3^2+4^2}=5\,cm$

$\frac{1}{2}*3*4=6\,cm^2$ $\frac{1}{2}*3*4=6\,cm^2$

7 cm

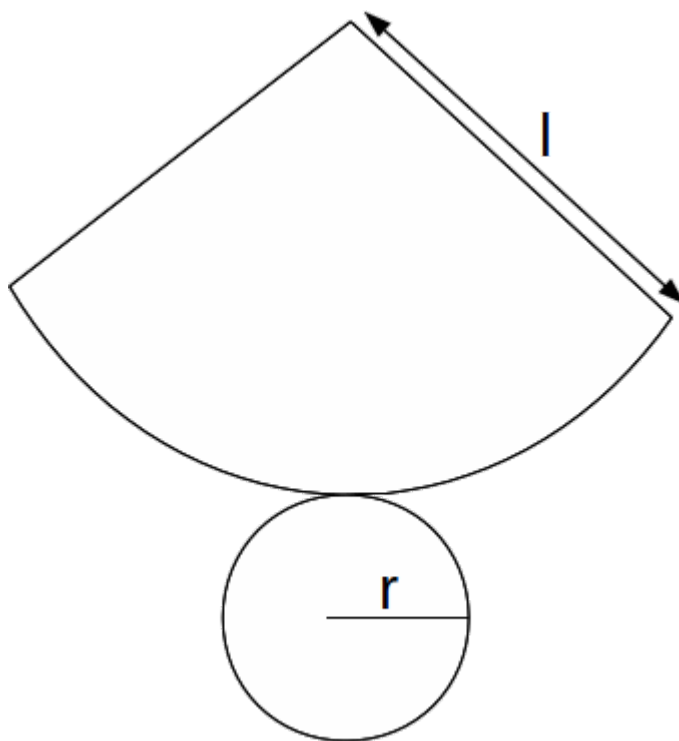3 cm   3 cm

3 cm   3*7=21cm²   3 cm

7 cm

The total area is the sum of the individual area: $A=35+28+21+6+6=96\ cm^2$.

The net of a cone is a sector of a circle, representing the curved surface, plus a circle, representing the base. If the slant height is l and the radius of the base is r,

The curved surface area is $\pi r l$ and the area of the base is πr^2. The net is shown below.

The total area is $\pi r l + \pi r^2 = \pi r (l + r)$.