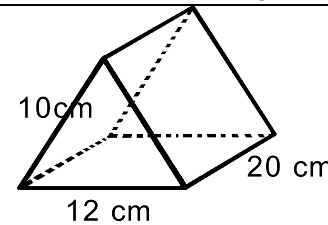
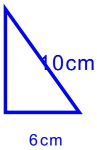
SURFACE AREA QUIZ—Find the surface area of… **ANSWERS**

1. a right prism: base is a triangle with sides 12cm, 10cm, 10cm
prism height is 20 cm .

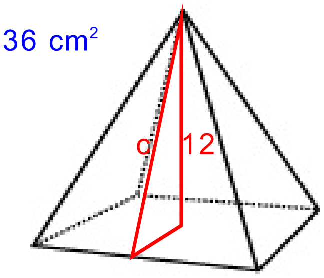


The SA of a prism is always the area of the two identical polygonal ends, plus the area of the lateral ▬ or ▰ sides.



2 • Area of one triangular End + Areas of lateral Sides (▇▇▇)
2 • (½) 12 cm • 8 cm + 20 cm (10 cm + 12 cm + 10 cm)
96 cm^2 + 20 cm (32 cm) = 736 cm^2

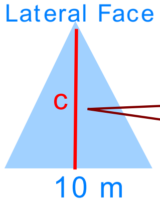
2. Find the surface area of a right pyramid, base 10 m square, height 12 m



The surface area of a pyramid or cone is always
the area of its base plus the area of its triangular lateral faces.

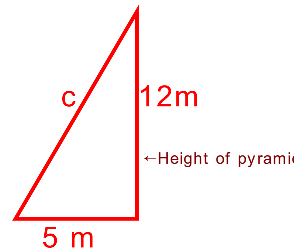
Area of square base + 4 (area of one triangular face)
10 m • 10 m + 4 (½) (10 m) (height of lateral side)
100 m^2 + 4 (½) (10 m) (13 m [work ↘])
100 m^2 + 260 m^2 = 360 m^2

Lateral Face



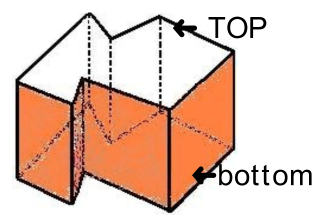
Important! The height of the lateral triangular FACE is *slanted* (leaning in towards the apex), & is LONGER than the height of the pyramid. Work ➔

$12^2 + 5^2 = c^2$
$144 + 25 = c^2$
$169 = c^2$
$13 = c$



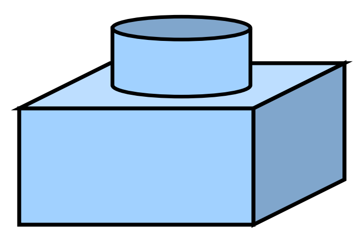
3. a right prism, given the height is 20cm, and the base has a perimeter of 78cm, and area 26 cm^2 .

The surface area of a prism is the area of the two identical polygonal ends, plus the area of the lateral sides. For a right prism, the area of the lateral sides adds up to the (sum of all the base lengths)(height) = (Perimeter of base) (height)
So the area of THIS prism is:



Area of top + Area of bottom + Total area of lateral sides
26 cm^2 + 26 cm^2 + (78 cm)(10 cm)
832 cm^2

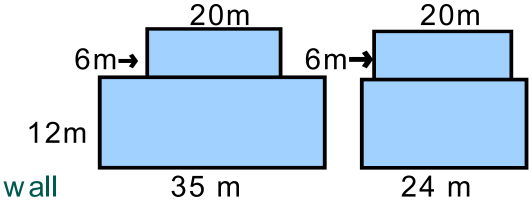
4. …the object illustrated at right.
Assume all angles that appear to be right angles are right, all arcs that appear circular or semicircular are, all surfaces that appear flat are so, and all surfaces that appear spherical* are so.



The small circular disc at the very top has area $\pi(10m)^2$
On the next level down is a rectangle with a circle cut out…
Area of "roof": $(35m)(24m) - \pi(10m)^2$.
The two together total (35m)(24m) = 840m^2 (the whole "roof"!)

The *bottom* of the object is another 840m^2

The front and back are 12m • 35m rectangles,
the sides, 12m • 24m rectangles .



The lateral sides of the cylindrical "dome" consist of a rectangular strip, 6m high by π(20m) long.

Total surface area:

Roof&bottom + Front & Back + 2 Sides + Cylindrical wall
= [2(35)(24) + 2(35)(12) + 2(24) (12) + π(6)(20)] m^2
= 1680 + 840 + 576 + 120 π m^2
= (3096 + 120 π) m^2

* (There are no spherical surfaces in this structure.)

VOLUME PROBLEMS

We can much MORE EASILY find the VOLUMES of these objects! They are:

(1) V of prism = (Area of Base)(Height)
= (area of prism's base [¡ ▲!]) · (height *of prism*)
= (½)(12cm)(8cm) • (20cm)
= 960 cm^3

(2) V of pyramid = one-third of the corresponding prism
= (1/3) (area of base) • (height)
= (⅓)(Area of square base)(height *of pyramid*)
= (1/3) • (10m)(10m) • 12m = 400 m^3

(3) V of prism = (Area of Base)(Height)
= ($26cm^2$)(10cm)
= 260 cm^3

(4) V = V of cylinder + V of box
= (Area of base *of cylinder*) • (height *of cylinder*) + (Area of base *of box*) • (height *of box*)
= (Area of cylinder's circular base) • (cylinder's height) + (Area of box base) • (box height)
= $\pi\,(10m)^2 \cdot (6m) + (12m)(35m) \cdot (24m)$
= $(600\pi + 10080)\ m^3$