

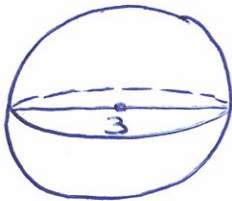
SPHERE: A 3-Dimensional circle  
(A ball or a globe)



SURFACE AREA SPHERE:

$$SA = 4\pi r^2 \quad (\text{or } \pi d^2)$$

Example 1: Find the surface area of a sphere with a diameter of 3'



Use Radius:

$$SA = 4\pi r^2 \\ = 4 \times \pi \times 1.5^2 \\ = 28.274$$

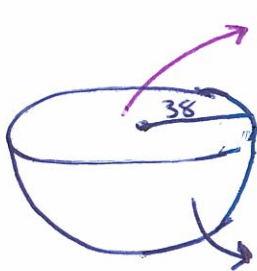
OR

Use Diameter:

$$SA = \pi d^2 \\ = \pi \times 3^2 \\ = 28.274$$

$$SA = 28.3 \text{ ft}^2$$

Example 2: Find the surface area of a hemisphere with a radius of 38 cm



$$\text{Top: } A = \pi r^2 \\ (\text{circle}) = \pi \times 38^2 \\ = 4536.460$$

$$SA = \frac{4\pi r^2}{2} = \frac{4 \times \pi \times 38^2}{2} = 9072.920$$

$$\begin{array}{r} \text{Total SA} \\ 4536.46 \\ + 9072.92 \\ \hline \end{array}$$

$$13609.38 \text{ cm}^2$$

Example 3: What is the diameter of a sphere with a surface area of 1256 cm<sup>2</sup>

$$SA = \pi d^2 \quad (\text{use this formula because we are trying to find diameter})$$

$$1256 = \pi d^2$$

$$\frac{1256}{\pi} = d^2$$

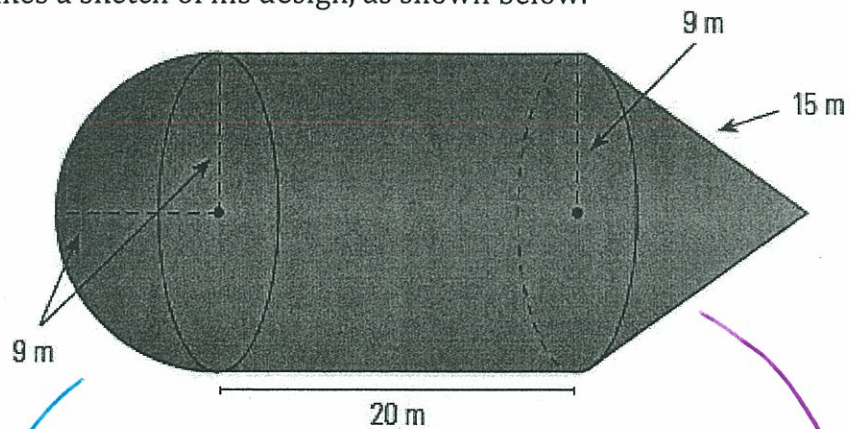
$$399.797 = d^2$$

$$\sqrt{399.797} = d$$

$$19.995 = d$$

$$\text{diameter} = 20 \text{ cm}$$

**Example 4:** Sunny has been contracted by a company to design a large balloon for the city's parade. He makes a sketch of his design, as shown below.



Find the surface area of the balloon

Hemisphere:

$$\begin{aligned}
 SA &= \frac{4\pi r^2}{2} \\
 &= \frac{4 \times \pi \times 9^2}{2} \\
 &= 508.938
 \end{aligned}$$

Side of Cylinder:

$$\begin{aligned}
 SA &= 2\pi r h \\
 &= 2 \times \pi \times 9 \times 20 \\
 &= 1130.973
 \end{aligned}$$

Side of Cone:

$$\begin{aligned}
 SA &= \pi r s \\
 &= \pi \times 9 \times 15 \\
 &= 424.115
 \end{aligned}$$

Total Surface Area  
(add them all up)

$$A = 508.938 + 1130.973 + 424.115$$

$$A = 2064.026$$

$$\boxed{2064 \text{ m}^2}$$

Example 5: Find the surface area of the composite shape below

Radius =  $3.4 \div 2 = 1.7$

Side of Cone  
 $SA = \pi r s$   
 $= \pi \times 1.7 \times 8.6$   
 $= 45.93$

Bottom Circle  
 $A = \pi r^2$   
 $= \pi \times 5.6^2$   
 $= 98.520$

Side of Cylinder  
 $SA = 2 \times \pi \times r \times h$   
 $= 2 \times \pi \times 5.6 \times 9.3$   
 $= 327.228$

Shaded Area  
 Big Circle:  
 $A = \pi \times 5.6^2$   
 $= 98.520$   
 Small Circle:  
 $A = \pi \times 1.7^2$   
 $= 9.079$   
 Shaded Area  
 $= 98.52 - 9.079$   
 $= 89.441$

Total Surface Area (add them all up)

$$\text{Area} = 45.93 + 98.52 + 89.441 + 327.228$$

$$= 561.119$$

$\text{Area} = 561 \text{ cm}^2$