CHAPTER 8: Measurement Relationships
8.6 Surface Area of a Sphere
Surface Area of a Sphere

The formula for the surface area of a sphere with radius r is $SA = 4\pi r^2$.
If you know the surface area of a sphere, you can determine the radius r, of a sphere.

Example:

a) A spherical storage tank has a radius of 8 m. Find the surface area of the tank.

b) A can of paint covers 20 m² and costs $30. How much will it cost to paint the tank?

c) A new tank will be built with a surface area of 2000 m². What radius will be required?

Solution:

a) $SA = 4\pi r^2$

$= 4 \times \pi \times 8^2$

$= 804.2 \ m^2$

The surface area of the tank is 804.2 m².

b) $\dfrac{804.2}{20} = 40.2$

The city will need to buy 41 cans of paint.

The cost will be $41 \times 30 = \$1230$.

c) $SA = 4\pi r^2$

$2000 = 4\pi r^2$

$\dfrac{2000}{4\pi} = \dfrac{4\pi r^2}{4\pi}$

$159.2 = r^2$

$12.6 \ m = r$

The new tank requires a radius of 12.6 m.

Practice:

1. a) The envelope of a hot air balloon can be approximated with a sphere with a radius of 12 m. Find the area of Dacron required to make the balloon.

b) Balloon quality Dacron sells for $5/m^2. How much does it cost to buy the Dacron for the balloon?

c) A smaller balloon has a surface area of 1000 m^2. What is the radius of this balloon?

Answers:

1. a) 1809.6 m^2 b) $9047.79   c) 8.9 m