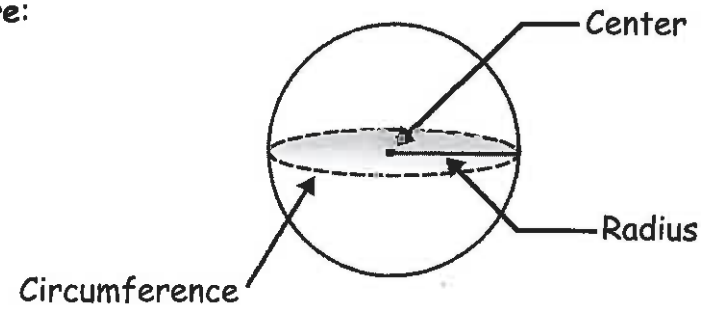
Geometry
Unit 11 – Day 3

Notes_____

Spheres

Sphere:



Surface Area: $S.A. = 4\pi r^2$

Volume: $V = \frac{4}{3}\pi r^3$

Examples:

1. Find the surface area and volume of an orange whose circumference is 12.5 inches.

$C = 2\pi r$

$12.5 = 2\pi r$

$r = \frac{12.5}{(2\pi)} \approx 1.989$ in.

$S.A = 4\pi r^2$

$= 4\pi(1.989)^2$

$\approx 49.7 \text{ in}^2$

$V = \frac{4}{3}\pi r^3$

$= \frac{4}{3}\pi(1.989)^3 \approx 32.98 \text{ in}^3$

2. The volume of the sphere is 36π cm^3. Find the surface area.

$V = 36\pi$

$V = \frac{4}{3}\pi r^3$

$36\pi = \frac{4}{3}\pi r^3$

Solve for r →

$27 = r^3$

$r = 3$

$S.A. = 4\pi r^2$

$= 4\pi(3)^2$

$= 36\pi \text{ cm}^3$

$\approx 113.1 \text{ cm}^3$

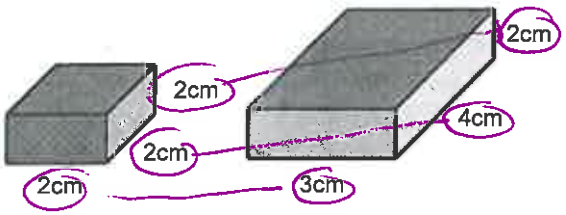
Similar Solids

Similar Solids: Two 3-D solids are similar if:

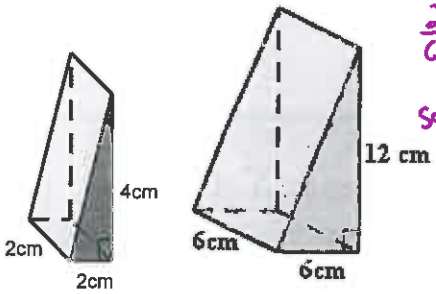
1. they are the same shape.
2. all corresponding dimensions are proportional.

Examples: Are the Prisms Similar?

1. Both are rectangular Prisms, but $\frac{2}{3} \neq \frac{2}{4} \neq \frac{2}{2}$ So they are $\neq$ Similar.



2. Both are Right Δ Prisms. and $\frac{2}{6} = \frac{2}{6} = \frac{4}{12}$ So, yes they are similar.



Theorem: If the Similarity Ratio of 2 similar solids is $a:b$, then

1) Ratios of the corresponding lengths is $a:b$
2) Ratios of the corresponding areas (Lateral & Surface) is $a^2:b^2$
3) Ratios of the volumes is $a^3:b^3$

Examples:

1. Two similar right cylinders have heights of 5 cm and 12 cm respectively. What is the ratio of their...

Lateral Areas? $\frac{5^2}{12^2} = \frac{25}{144}$

Surface Areas? $\frac{25}{144}$

Volumes? $\frac{5^3}{12^3} = \frac{125}{1728}$

2. The ratio of the volumes of two similar spheres is 64:27. What is the ratio of their...

Diameters? $\frac{\sqrt[3]{64}}{\sqrt[3]{27}} = \frac{4}{3}$

Surface Areas? $\left(\frac{4}{3}\right)^2 = \frac{16}{9}$