Warm Up

Find the surface area and volume of each solid.

1. Sphere with radius 7.3 ft

\[ S.A. = 4\pi r^2 \]
\[ V = \frac{4}{3} \pi r^3 \]

2. Right rectangular prism with side lengths 8 in, 5 in, and 10 in

\[ S.A. = 10.8 + 10.8 + 5.8 + 5.8 + 5.10 + 5.10 \]
\[ V = 70 \cdot 5.8 = 105.8 \]

12-7 Similar Solids

Sides of similar solids have a ratio of \( \frac{a}{b} \)

Surface areas of similar solids have a ratio of \( \frac{a^2}{b^2} \)

Volumes of similar solids have a ratio of \( \frac{a^3}{b^3} \)
Ex 1  Two balls are similar with a scale factor of 7:6. The larger ball has a surface area of 249.55 in$^2$ and a volume of 371.61 in$^3$. Find the surface area and volume of the smaller ball.

\[
\frac{7^2}{6^2} = \frac{249.55}{x} \quad 183.34 \text{ in}^2
\]

\[
\frac{7^3}{6^3} = \frac{371.61}{y} \quad 234.01 \text{ in}^3
\]

Ex 2  Two prisms are similar with a scale factor of 2:3. The smaller prism has a surface area of 40 in$^2$ and a volume of 60 in$^3$. Find the surface area and volume of the larger prism.

\[
\text{S.A.} : \quad \frac{2^2}{3^2} = \frac{40}{x} \quad 90 \text{ in}^2
\]

\[
\text{V.} : \quad \frac{2^3}{3^3} = \frac{60}{y} \quad 202.5 \text{ in}^3
\]
Ex 3 Two cones are similar. One cone has a volume of 125 m$^3$. The other cone has a volume of 512 m$^3$. Find the scale factor of the first cone to the second cone.

\[
\frac{a^3}{b^3} = \frac{125}{512}
\]

\[
\frac{a}{b} = \frac{5}{8}
\]

Ex. 4 Two pyramids are similar. The first pyramid has a volume of 1000 in$^3$ and the second pyramid has a volume of 216 in$^3$. Find the scale factor of the first to the second pyramid.

\[
\frac{a^3}{b^3} = \frac{1000}{216}
\]

\[
\frac{a}{b} = \frac{10}{6} \quad \frac{5}{3}
\]