Prism - is a solid figure having at least one pair of parallel surfaces that create a uniform cross section

Bases - Face that creates that uniform cross section
Lateral Faces - other sides or faces which are parallelograms

Lateral Edges - line segment created where the two faces meet

Altitude - perpendicular segment that joins the bases

Height - length of the altitude
Right Prism - lateral edges are perpendicular to the bases

NOT a right prism
How many gallons of gas will it take to fill the tank? It is 1 foot tall, 2.5 feet long, and 1.5 feet in depth.
You have a lap pool that is 3 feet deep on one end and 8 feet deep on the other end which is 25 feet away while the pool is 14 feet wide. How many gallons to fill the pool?

Fun with Shapes!
9.3 Cylinders and Spheres

Cylinder - prism with circular bases

Lateral Surface - surface between the bases

Altitude - perpendicular segment that joins bases

Height - length of altitude

Right Cylinder - axis is perpendicular to base

\[ V = (\pi r^2)h \]

\[ L = 2\pi rh \]

\[ S = 2\pi rh + 2\pi r^2 \]
A pipe has an interior diameter of 3.5 inches and runs 25 feet up the wall of a building. When the pipe is full, what is the weight of the water in the pipe? 1 ft³ of water is 62.4 lbs.

\[
V = \pi \left(1.75\right)^2 \left(300\right) = \frac{25 \times 12}{1} \times 300 = 2886.34 \text{ in}^3
\]

\[
\frac{2886.34 \text{ in}^3}{1728 \text{ in}^3} = 1.67 \text{ ft}^3
\]

\[
1.67 \text{ ft}^3 \times 62.4 \text{ lbs} = 104.22 \text{ lbs}
\]

\[
104.22 \text{ lbs} \approx 104\text{ lb}
\]

\[
100 \text{ lb}
\]

If a bucket is 15 inches tall and has a radius of 5 inches, how many gallons will it hold?

\[
V = \pi \left(5\right)^2 \left(15\right)
\]

\[
V = 1178.1 \text{ in}^3
\]

\[
\frac{1178.1 \text{ in}^3}{231 \text{ in}^3} = 5.09 \text{ ga}
\]
Surface Area of a Sphere

\[ SA = 4\pi r^2 \]

Volume of a Sphere

\[ V = \frac{4}{3}\pi r^3 \]
What is the volume of a basketball if the radius is 4.5 inches?

\[
V = \frac{4}{3} \pi (4.5)^3 \\
V = 381.7 \text{ in}^3
\]

What will be the weight of a spherical steel tank of radius 9 ft when it is full of water? The steel used weighs 127 lbs/ft\(^2\) and the water is 62.4 lbs/ft\(^3\). Round to the nearest hundred pounds.

\[
\text{Weight of water}\] \\
V = \frac{4}{3} \pi (9)^3 \\
V = 3053.63 \text{ ft}^3 \times 62.4 \text{ lbs/ft}^3 = 190546.4 \text{ lbs}
\]

\[
\text{Weight of steel}\] \\
SA = 4 \pi r^2 \\
SA = 4 \pi (9)^2 \\
SA = 1017.9 \text{ ft}^2 \times 127 \text{ lbs/ft}^2 \\
= 129270 \text{ lbs} \\
+ 190546.4 \text{ lbs} \\
\boxed{319816.4 \text{ lbs}}
\]

319800 lbs