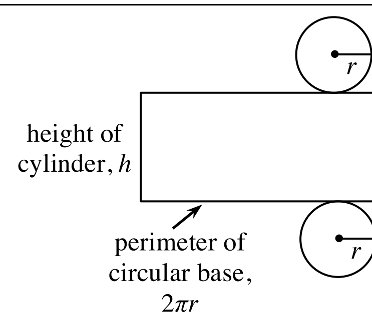
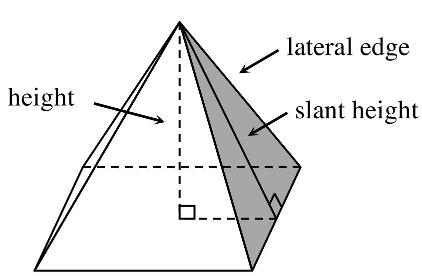
Three-Dimensional Solids Toolkit
POSSIBLE SOLUTIONS

	Volume	Surface Area
Prisms	V = (# cubes in bottom layer) · (# layers) V = (area of base) · (height) An oblique prism has the same volume as a right prism of the same base area and height.	S.A. = Add up the areas (area = length · width) of all the rectangles that make up the solid An oblique prism does *not* have the same surface area as a right prism with the same base area and height.
Cylinders	V = (# cubes in bottom layer) · (# layers) V = (area of circular base) · (height) V = (πr^2) · h An oblique cylinder has the same volume as a right cylinder of the same base area and height.	 S.A. = area of bases and "top" = $(\pi r^2)(2)$ + area of lateral face = $(2\pi r)(h)$
Pyramids	V = $\frac{1}{3}$(volume of prism with same base and height) V = $\frac{1}{3}$ (area of base) · (height) 	S.A. = area of polygon base + area of lateral triangular faces Lateral surface area does not include the base.

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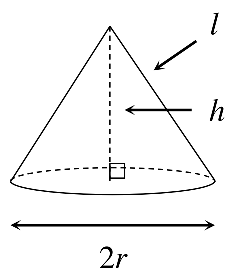
<table>
<tr><th></th><th>Volume</th><th>Surface Area</th></tr>
<tr><td>Cones</td><td>
V = $\frac{1}{3}$(volume of cylinder w/ same base and height)
V = $\frac{1}{3}$(area of circular base) · (height)
V = $\frac{1}{3}$ (πr^2) · h


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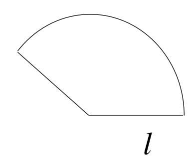
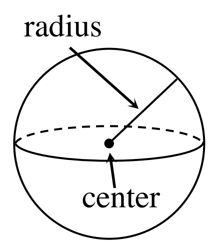
Unroll the cone to create a sector. The radius of the sector is the slant height, l, of the cone, and the arc length is the circumference of the base of the cone, $2\pi r$. Therefore, the area of the sector (the lateral surface area of the cone) is:
$LA = \frac{2\pi r}{2\pi l}\pi l^2 = \pi rl$


</td></tr>
<tr><td>Spheres</td><td>
V = $\frac{2}{3}$(volume of cylinder with same radius)
V = $\frac{2}{3}$(area of center circle) · (height)
V = $\frac{2}{3}$ (πr^2) · $2r$
V = $\frac{4}{3}\pi r^3$

OR

V = 2 · (volume of cone with same radius)
V = 2 · $\frac{1}{3}$(area of center circle)·(height)
V = 2 · $\frac{1}{3}$ (πr^2) · $2r$
V = $\frac{4}{3}\pi r^3$
</td><td>
S.A. = 4 · area of center circle
S.A. = 4 · πr^2


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