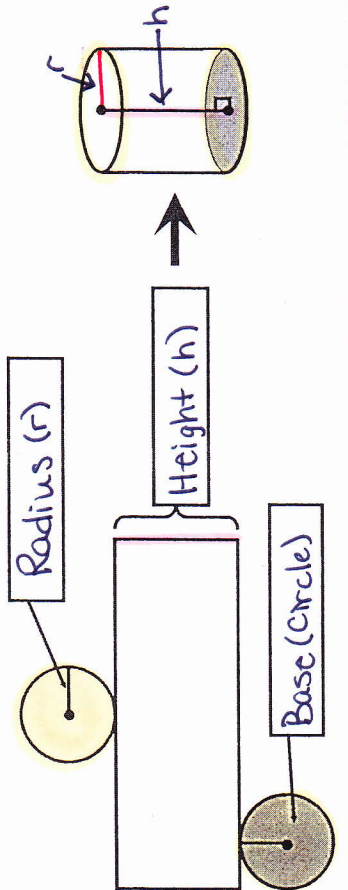


**NOTES 12.2/12.4b**

**LATERAL AREA, SURFACE AREA, AND VOLUME OF CYLINDERS**

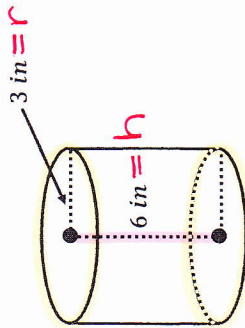
The figure below is a net for a right cylinder:



**FORMULAS**

<b>LATERAL AREA:</b>	<b>SURFACE AREA:</b>	<b>VOLUME:</b>
$LA = 2\pi r h$	$SA = LA + 2\pi r^2$	$V = \pi r^2 h$

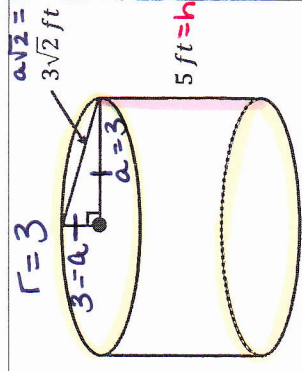
**EXAMPLE 1:** For the cylinder below, find the EXACT Lateral Area, Surface Area, and Volume.



$$\begin{aligned}
 LA &= 2\pi r h \\
 &= 2\pi(3)(6) \\
 &= 36\pi \\
 SA &= LA + 2\pi r^2 \\
 &= 36\pi + 2\pi(3)^2 \\
 &= 36\pi + 18\pi \\
 &= 54\pi \\
 V &= \pi r^2 h \\
 &= \pi(3)^2(6) \\
 &= 54\pi
 \end{aligned}$$

$$\begin{aligned}
 LA &= 36\pi \text{ in}^2 \\
 SA &= 54\pi \text{ in}^2 \\
 V &= 54\pi \text{ in}^3
 \end{aligned}$$

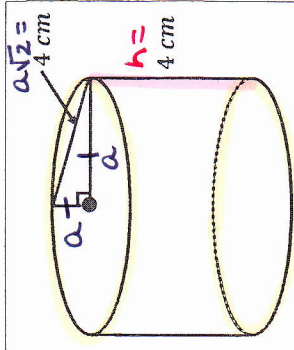
**EXAMPLE 2:** For the cylinder below, find the EXACT Lateral Area, Surface Area, and Volume.



$$\begin{aligned}
 LA &= 2\pi r h \\
 &= 2\pi(3)(5) \\
 &= 30\pi \\
 SA &= LA + 2\pi r^2 \\
 &= 30\pi + 2\pi(3)^2 \\
 &= 30\pi + 18\pi \\
 &= 48\pi \\
 V &= \pi r^2 h \\
 &= \pi(3)^2(5) \\
 &= 45\pi
 \end{aligned}$$

$$\begin{aligned}
 LA &= 30\pi \text{ ft}^2 \\
 SA &= 48\pi \text{ ft}^2 \\
 V &= 45\pi \text{ ft}^3
 \end{aligned}$$

**EXAMPLE 3:** For the cylinder below, find the EXACT Lateral Area, Surface Area, and Volume.



$$\begin{aligned}
 \sqrt{2} \cdot a\sqrt{2} &= 4 \cdot \sqrt{2} \\
 2a &= 4\sqrt{2} \\
 r &= a = 2\sqrt{2} \\
 LA &= 2\pi r h \\
 &= 2\pi(2\sqrt{2})(4) \\
 &= 16\sqrt{2}\pi \\
 SA &= LA + 2\pi r^2 \\
 &= 16\sqrt{2}\pi + 2\pi(2\sqrt{2})^2 \\
 &= 16\sqrt{2}\pi + 16\pi \\
 V &= \pi r^2 h \\
 &= \pi(2\sqrt{2})^2(4) \\
 &= 32\pi
 \end{aligned}$$

$$\begin{aligned}
 LA &= 16\sqrt{2}\pi \text{ cm}^2 \\
 SA &= 16\sqrt{2}\pi + 16\pi \text{ cm}^2 \\
 V &= 32\pi \text{ cm}^3
 \end{aligned}$$