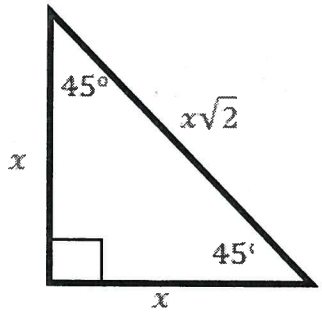
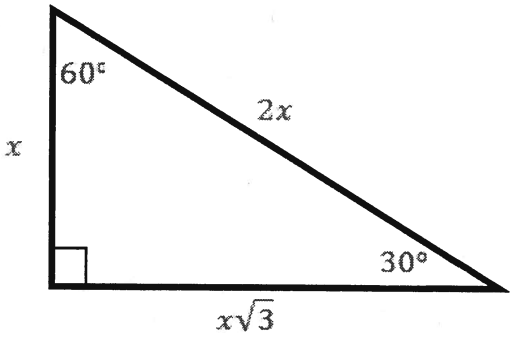
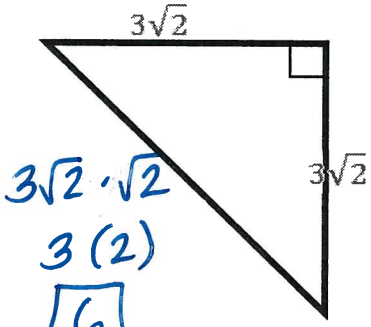
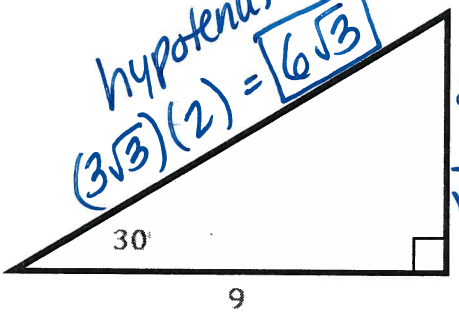
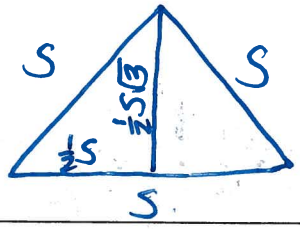
GEOMETRY REVIEW

DAY 1

$45°-45°-90°$ Triangles	$30°-60°-90°$ Triangles
In a $45°-45°-90°$ triangle, the hypotenuse is $\sqrt{2}$ times as long as each leg.	In a $30°-60°-90°$ triangle, the hypotenuse is twice as long as the shorter leg, and the longer leg is $\sqrt{3}$ times as long as the shorter leg.
	
1. Find the lengths of the missing side(s).  $3\sqrt{2}\cdot\sqrt{2}$ $3(2)$ $\boxed{6}$	2. Find the lengths of the missing side(s).  hypotenuse $(3\sqrt{3})(2) = \boxed{6\sqrt{3}}$ Short $\frac{9}{\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}} = \frac{9\sqrt{3}}{3} = \boxed{3\sqrt{3}}$ Long

Area of a Triangle: Area of a triangle: $A = \frac{1}{2}bh$

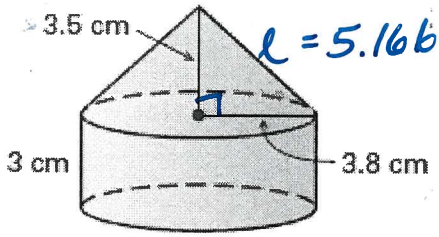
Area of an Equilateral Triangle: $A = \frac{s^2\sqrt{3}}{4}$



3. Find the area of an equilateral triangle with side length of 6. $A = \frac{1}{2}(s)(\frac{1}{2}s\sqrt{3})$ $A = \frac{s^2\sqrt{3}}{4}$ $A = \frac{6^2\sqrt{3}}{4}$ $A = \frac{36\sqrt{3}}{4}$ $\boxed{A = 9\sqrt{3}}$	4. Find the area of an equilateral triangle with side length of $\sqrt{6}$ $A = \frac{s^2\sqrt{3}}{4}$ $A = \frac{(\sqrt{6})^2\sqrt{3}}{4}$ $A = \frac{6\sqrt{3}}{4}$ $\boxed{A = \frac{3\sqrt{3}}{2}}$

Cylinder	Cone	Sphere
$S = 2\pi r^2 + 2\pi rh$ $V = \pi r^2 h$ 	$S = \pi r^2 + \pi rl$ $V = \frac{1}{3}\pi r^2 h$	$S = 4\pi r^2$ $V = \frac{4}{3}\pi r^3$

5. Find the surface area.



$l^2 = 3.5^2 + 3.8^2$

$l = 5.166$

Cyl. Height = 3cm

Cyl Radius = 3.8 cm

Cone Height = 3.5cm

Cone Radius = 3.8 cm

Cone lateral height = 5.166

SA_{cyl} = ~~○~~ + ○ + $\underset{2\pi r}{\square}$ h

$= \cancel{\pi r^2} + \pi r^2 + 2\pi rh$

$= \pi r^2 + 2\pi rh$

$= \pi(3.8)^2 + 2\pi(3.8)(3)$

$= 14.44\pi + 22.8\pi$

SA_{cone} = ~~○~~ + ◠

$= \cancel{\pi r^2} + \pi rl$

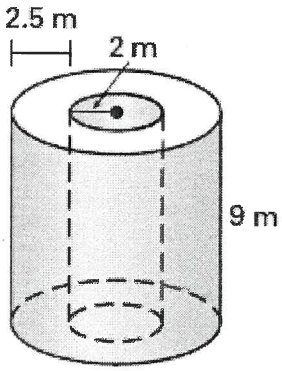
$= \pi(3.8)(5.166)$

$= 19.63\pi$

Total SA $= 14.44\pi + 22.8\pi + 19.63\pi$

$= \boxed{56.87\pi \text{ cm}^2}$

6. Find the volume.



Large: $r_1 = 4.5$ m, $h_1 = 9$ m

Small: $r_2 = 2$ m, $h_2 = 9$ m

Total Volume = Large cyl. − Small cyl.

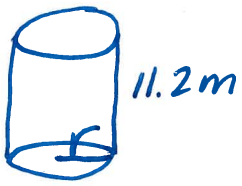
$= \pi(r_1)^2(h_1) - \pi(r_2)^2(h_2)$

$= \pi(4.5)(9) - \pi(2)^2(9)$

$= 182.25\pi - 36\pi$

$= \boxed{146.25\pi \text{ m}^3}$

7. Find the radius of the cylinder if the surface area is $363.6\pi\ m^2$ and the height of the cylinder is $11.2\ m$.



$SA = 363.6\pi$

$SA = 2\pi r^2 + 2\pi rh$

$\frac{363.6\pi}{2\pi} = \frac{2\pi r^2}{2\pi} + \frac{2\pi r(11.2)}{2\pi}$

$181.8 = r^2 + 11.2r$

$-181.8 \qquad -181.8$

$0 = r^2 + 11.2r - 181.8$

$r = \frac{-11.2 \pm \sqrt{11.2^2 - 4(1)(-181.8)}}{2(1)}$

$r = \frac{-11.2 \pm \sqrt{125.44 + 727.2}}{2}$

$r = \frac{-11.2 \pm \sqrt{852.64}}{2}$

$r = \frac{-11.2 \pm 29.2}{2}$

$r = \frac{-11.2+29.2}{2}, \frac{-11.2-29.2}{2}$

$r = 9, -20.2$

$\boxed{r = 9m}$

8. A grain storage tank is in the shape of a cylinder covered by a half sphere. The height of the cylinder is 50 feet and its diameter is 80 feet. Find the total surface area (including the base) and volume of the tank.

Cyl: $r = 40ft$
$h = 50ft$

Sph: $r = 40ft$

$SA = 0 + \square + \frac{1}{2}\bigcirc$

$SA = \pi r^2 + 2\pi rh + \frac{1}{2}4\pi r^2$

$SA = \pi(40)^2 + 2\pi(40)(50) + 2\pi(40)^2$

$\boxed{SA = 8800\pi\ ft^2}$

$V = \pi r^2 h + \frac{1}{2}\left(\frac{4}{3}\pi r^3\right)$

$V = \pi(40)^2(50) + \frac{4}{6}\pi(40)^3$

$V = \frac{3}{3}\cdot 80{,}000\pi + \frac{128{,}000}{3}\pi$

$\boxed{V = \frac{368{,}000}{3}\pi\ ft^3}$

9. The surface area of a cylinder is 1000π square centimeters. The radius of the cylinder is four times the height. What is the height of the cylinder?

$SA = 2\pi r^2 + 2\pi rh$

$1000\pi = 2\pi(4h)^2 + 2\pi(4h)h$

$\frac{1000\pi}{2\pi} = \frac{2\pi(16h^2)}{2\pi} + \frac{8\pi h^2}{2\pi}$

$500 = 16h^2 + 4h^2$

$\frac{500}{20} = \frac{20h^2}{20}$

$\sqrt{25} = \sqrt{h^2}$

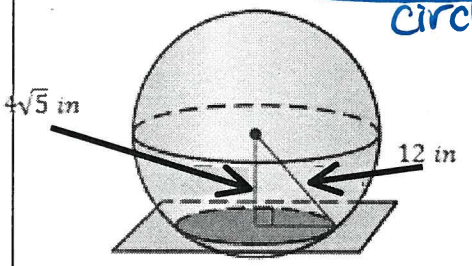
$\pm 5 = h$

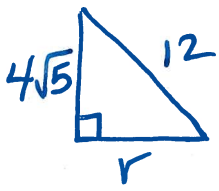
$5 = h$

$h = 5\text{cm}$

10. Find the area of intersection of the sphere and plane. Write your answer in terms of pi.

circle





$r^2 + (4\sqrt{5})^2 = 12^2$

$r^2 + 16(5) = 144$

$r^2 + 80 = 144$

$-80 \quad -80$

$\sqrt{r^2} = \sqrt{64}$

$r = \pm 8$

$r = 8\text{ in}$

$A = \pi r^2$

$A = \pi 8^2$

$A = 64\pi\text{ in}$