Geometry Journal: 3-Dimensional Objects

Post, Thm, or Defn	Example/Drawing	Conclusion
1. Area of 2-Dimensionals A] **Square:** $s \cdot s = s^2$ B] **Rectangle:** $b \cdot h$ C] **Triangle:** $\frac{1}{2}(b \cdot h)$ $b \perp h$ D] **Parallelogram:** $b \cdot h$ $b \perp h$ E] **Trapezoid:** $\frac{1}{2}h(b_1 + b_2)$ F] **Circle:** πr^2	A] 4cm, 4cm B] 2in, 6 in C] 3mm, 5 mm; 2', 4' D] 6 m, 9 m E] 8 ft, 6 ft, 12 ft F] 5 ft	A] $A = s^2 = 4^2 = 16cm^2$ B] $A = b \cdot h = 2 \cdot 6 = 12\ in^2$ C] $A = \frac{1}{2}(b \cdot h) = \frac{1}{2}(3 \cdot 5) = 7.5$ mm $= \frac{1}{2}(2 \cdot 4) = 8'$ D] $A = b \cdot h = 6 \cdot 9 = 54m^2$ E] $A = \frac{1}{2}h(b_1 + b_2)$ $= 3(20) = 60ft^2$ F] $A = \pi r^2 = \pi \cdot 25 = 25\pi$ ≈ 78.54
2. Rectangular Prism $SA = 2lw + 2lh + 2wh$ $V = lwh$	4, 10, 7 Find SA and Vol. if : $l = 10$, $w = 7$ $h = 4$	$SA = 2lw + 2lh + 2wh$ $= (2 \cdot 70) + (2 \cdot 40) + (2 \cdot 28)$ $= 140 + 80 + 56 = 276\ u^2$ $V = lwh = 10 \cdot 7 \cdot 4 = 280\ u^3$
3. Triangular Prism **Bases are Triangles** $LA = hp$ (area w/o bases) $SA = LA + 2B$ $V = Bh$	10, 6, x (h of Δ), 15 (h of prism)	x: $c^2 = a^2 + b^2$; $10^2 = x^2 + 6^2$; $100 - 36 = x^2$; $x = 8$ p = perimeter = 8 + 6 + 10 = 24 B = area of base = $\frac{1}{2}(6 \cdot 8) = 24$ **LA = hp**: = 15(24) =360cm² **SA = LA + 2B**: = 360+2(24) = 360 + 48 = 408 cm² **V = Bh**: = 24(15) = 360cm³

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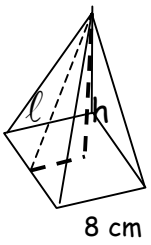
4. Square Pyramid:
Base Is Square

$V = \frac{1}{3}Bh$ h = vertical height

$LA = \frac{1}{2}\ell p$ ℓ = slant height

$SA = LA + B$

ℓ = 5 cm



$\frac{1}{2}$(side) = 4

Find: h, B, p, LA., SA, V

$h\begin{cases} c^2 = a^2 + b^2 \\ 5^2 = 4^2 + h^2 \end{cases}$ h = 3

B = LW
$= 8^2 = 64$

p = 8(4) = 32

$LA = \frac{1}{2}\ell p = \frac{1}{2}(5)(32) = 80\ cm^2$

SA = LA + B
= 80 + 64
= 144 cm^2

$V = \frac{1}{3}Bh$
$= \frac{1}{3}(64)(3)$
= 64 cm^3

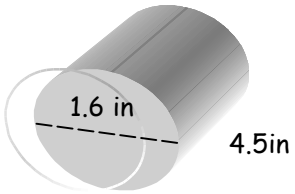
5. Cylinder:
Bases are Circles

$V = \pi r^2 h$

$LA = 2\pi rh$

$SA = 2\pi r(h + r)$

height = 4.5in diameter = 1.6 in



Find SA and Volume:

$r = \frac{1}{2}d = \frac{1}{2}(1.6) = 0.8$ cm

$SA = 2\pi r(h + r)$
$= 2\pi(0.8)(4.5 + 0.8)$
$= 8.48\pi \approx 26.6\ cm^2$

$V = \pi r^2 h$
$= \pi(0.8^2)4.5$
$= 2.88\pi \approx 9.04\ cm^3$

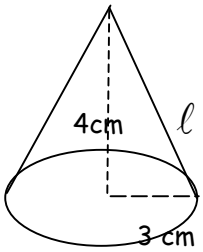
6. Cone:
Base is a Circle

$V = \frac{1}{3}\pi r^2 h$

$LA = \pi r\ell$

$SA = \pi r(\ell + r)$

ℓ = slant height



Find ℓ, LA, SA, V.

$\ell\begin{cases} c^2 = a^2 + b^2 \\ \ell^2 = 3^2 + 4^2 \end{cases}$ $\ell = 5$

$LA = \pi r\ell$
$= \pi(3)(5)$
$= 15\pi \approx 47.1\ cm^2$

$SA = \pi r(\ell + r)$
$= \pi(3)(5 + 3)$
$= 24\pi \approx 75.36\ cm^2$

$V = \frac{1}{3}\pi r^2 h$
$= \frac{1}{3}\pi(9)(4) = 12\pi \approx 37.68\ cm^3$

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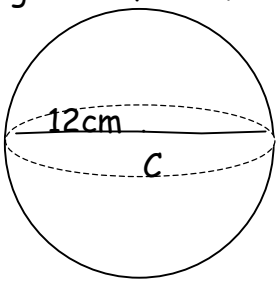
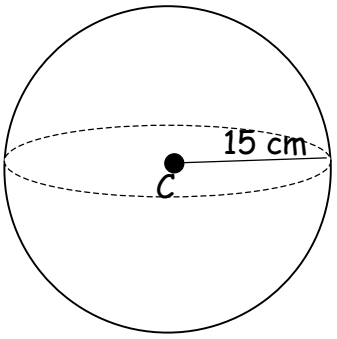
7. **Sphere** $SA = 4\pi r^2$	Find amount of leather covering the soft ball.  	r = 6 $SA = 4\pi(6^2)$ $= 4\pi(36)$ $SA = 144\ \pi\ cm^2$ (exact) $\approx 144(3.14) =$ $452.16\ cm^2$
8. **Sphere** $V = \frac{4}{3}\pi r^3$	 	$V = \frac{4\pi r^3}{3}$ $= \frac{4\pi(15)^3}{3}$ $= 4500\ \pi cm^3$ exact $4500(3.14) \approx 14130\ cm^3$
9. **For ~ Polygons:** ratio of areas = (scale factor)^2 (If the length of a rectangle is increased by a factor of 3 the area is increased by a factor of 9)	**Given** : 2 similar rectangles The area of the smaller is 120 cm^2, their widths have a ratio of 1:5, what is the area of the larger rectangle.	scale factor = $\square$ $\frac{area\ small}{area\ large} = \left(\frac{1}{5}\right)^2$ $\frac{120}{x} = \frac{1}{25}$ area of large rectangle = $3000cm^2$
10. **For ~ Polygons:** ratio of volumes = (scale factor)^3 (If the radius of a cone is increased by a factor of 3, the volume is increased by a factor of 27 (3^3))	**Given**: 2 similar pyramids Their heights have a ratio of 3:2. The volume of the smaller pyramid is $450cm^3$. Find the volume of the larger pyramid	**Scale factor** : $\frac{3}{2}$ so **volume ratio** : $\left(\frac{3}{2}\right)^3 = \frac{27}{8}$ $\frac{27}{8} = \frac{x}{450}$ $12150 = 8x$ $x = 1518.75\ cm^3$