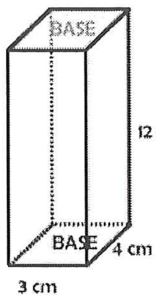
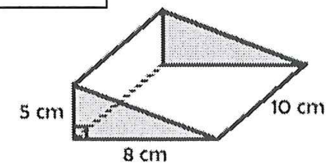
Key :)

ACC GEOMETRY
VOLUME NOTES

Volume of a Prism = $(area\ of\ base) \cdot H$
H= Height between bases



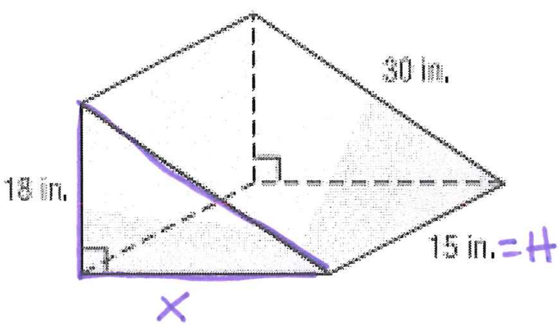
Name: Rectangular Prism
V = Bh
V = (Area of Rectangle)(height)
V = (3)(4) (12)
V = 144 cm^3



Name: Triangular Prism
V = Bh
V = (Area of Triangle)(height)
V = ½ (5)(8) (10)
V = 200 cm^3

Directions: Find the volume of the following figures. Use exact values and rounded to the nearest thousandth.

Example 1:



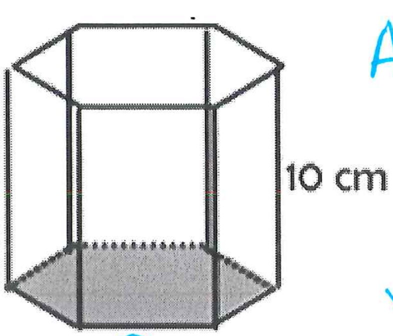
$x^2+18^2=30^2$
$x^2=576$
$x=24\text{in}$

Area of Base
$A_B=\frac{1}{2}24\cdot 18$

V=(Area of base)×H
$V=\left(\frac{1}{2}24\cdot 18\right)\cdot 15$

$V=3240\text{in}^3$

Example 2:



make

Area of Hexagon
$A_B=6\frac{1}{2}8\cdot 8\sin 60$

Recall
$\boxed{\sin 60=\frac{\sqrt{3}}{2}}$

$H=10$

$V=\left(6\frac{1}{2}8\cdot 8\sin(60)\right)\cdot 10$

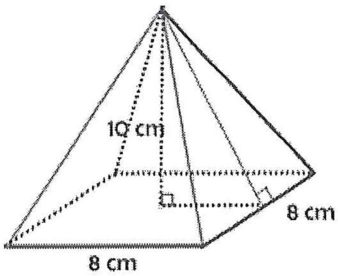
$V\approx 1662.769\text{ cm}^3$ ← Rounded

$V=960\sqrt{3}\text{ cm}^3$ ← exact

Volume of a Pyramid = $\frac{1}{3}(\boldsymbol{area\ of\ base}) \cdot \boldsymbol{H}$

Area of base: πr^2

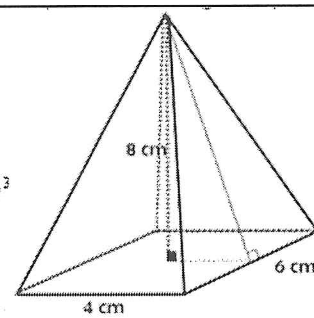
H= Height of pyramid



$$Volume_{PYRAMID} = \frac{1}{3}Bh$$

$$Volume_{PYRAMID} = \frac{1}{3}(Base\ Area)(height)$$

$$Volume_{PYRAMID} = \frac{1}{3}(8)(8)(10) = 213\frac{1}{3}\ cm^3$$



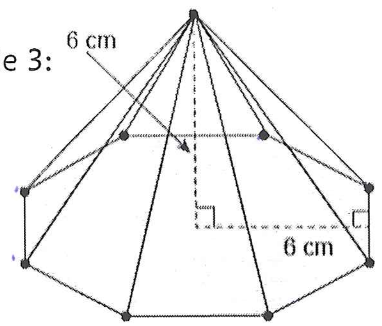
$$Volume_{PYRAMID} = \frac{1}{3}Bh$$

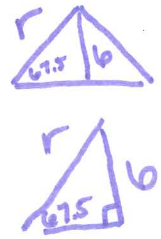
$$Volume_{PYRAMID} = \frac{1}{3}(Base\ Area)(height)$$

$$Volume_{PYRAMID} = \frac{1}{3}(4)(6)(8) = 64\ cm^3$$

Directions: Find the volume of the following figures. Use exact values and rounded to the nearest thousandth.

Example 3:





$\sin(67.5) = \frac{6}{r}$

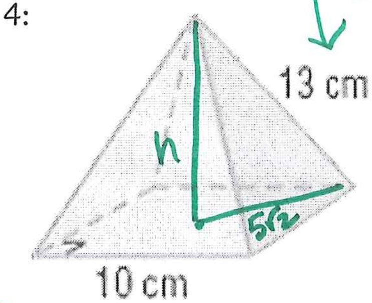
$r = 6.494$

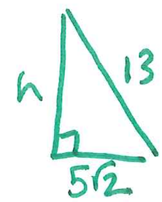
$V = \frac{1}{3}\left(8\frac{1}{2}(6.494)^2\sin(45)\right)\cdot 6$ $A_B = 8\frac{1}{2}(6.494)^2\sin(45)$

$V \approx 238.561\, cm^3$

Example 4:

edge





$h^2 + (5\sqrt{2})^2 = 13^2$

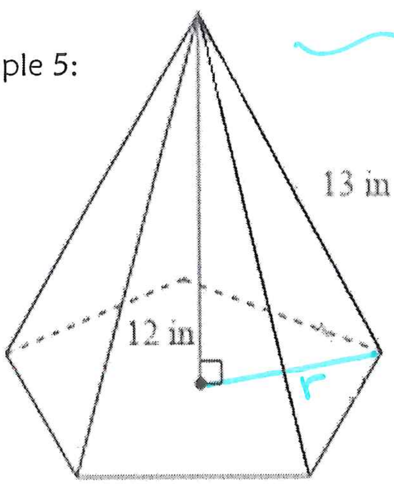
$h^2 + 50 = 169$

$h = \sqrt{119}$

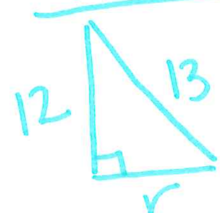
Formula $\longrightarrow$ $V = \frac{1}{3}10 \cdot 10 \cdot \sqrt{119}$

$V \approx 363.624\, cm^3$

Example 5:



Find r



$r = 5$

$A_B = 5\frac{1}{2}5 \cdot 5\sin(72)$

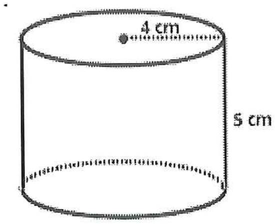
$V = \frac{1}{3}\left(5\frac{1}{2}5\cdot 5\sin(72)\right)\cdot 12$

$V \approx 237.764\, in^3$

Volume of a cylinder= $(area\ of\ base) \cdot H$

Area of base: πr^2

H= Height between bases



V = Bh

V = (Area of Circle)(height)

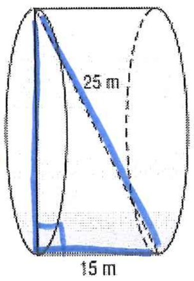
V = (πr^2) (h)

V = $\pi(4)^2$ (5)

V = 80π cm^3

Directions: Find the volume of the following figure. Use exact values and rounded to the nearest thousandth.

Example 6:



$20 = d$

$d^2 + 15^2 = 25^2$

$d = 20$

$\boxed{r = 10}$

$V = \pi 10^2 \cdot 15$

$\boxed{V = 1500\pi\ m^3}$

≈ 4712.389

Example 7: If the volume of a cylinder is 864π cm³ with a height of 6cm, find the diameter.

$V = \pi r^2 \cdot H$

$\frac{864\pi}{6\pi} = \frac{\pi r^2 \cdot 6}{6\pi}$

$144 = r^2$

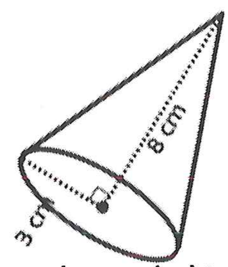
$r = 12cm$

$\boxed{d = 24cm}$

Volume of a Cone= $\frac{1}{3}(area\ of\ base) \cdot H$

Area of base: πr^2

H= Height of the cone



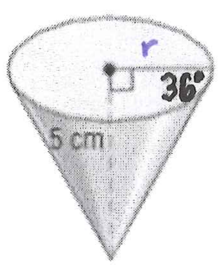
$Volume_{CONE} = \frac{1}{3}Bh$

$Volume_{CONE} = \frac{1}{3}\pi(3)^2(8$

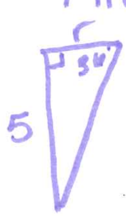
$Volume_{CONE} = 24\pi\ cm^3$

Directions: Find the volume of the following figure. Use exact values and rounded to the nearest thousandth.

Example 8:



Find r



$\tan(36°) = \frac{5}{r}$

$r = 6.882$

$V = \frac{1}{3}\pi(6.882)^2 \cdot 5$

$\boxed{V \approx 247.986 cm^3}$

Example 9: If the volume of a cone is 48π cm³ with a radius of 4cm, find the height.

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

$48\pi = \frac{1}{3}\pi 4^2 \cdot H$

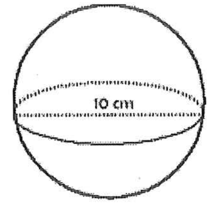
$48\pi = \frac{16}{3}\pi \cdot h$

$144\pi = 16\pi H$

$\boxed{9cm = H}$

Volume of a Sphere = $\frac{4}{3}\pi r^3$

Recall SA= $4\pi r^2$



$V_{SPHERE} = \frac{4}{3}\pi r^3$

$V_{SPHERE} = \frac{4}{3}\pi(5)^3$

$V_{SPHERE} = \frac{500}{3}\pi\ cm^3$

Example 10: A sphere has a SA of 676π cm², find the radius.

$$\frac{676\pi}{4\pi} = \frac{4\pi r^2}{4\pi}$$

$$169 = r^2$$

$$\sqrt{169} = r$$

$$13 = r$$

$\boxed{r = 13cm}$

a square root undoes a square.

Example 11: A sphere has a volume of 4500π m³, find the radius. $\boxed{Alg}$

$$V = \frac{4}{3}\pi r^3$$

$$4500\pi = \frac{4}{3}\pi r^3$$

$$\frac{13500\pi}{4\pi} = \frac{4\pi r^3}{4\pi}$$

$$3375 = r^3$$

a cube root ($\sqrt[3]{\ }$) undoes a cube.

* ~~calculator~~ work: use $\sqrt[3]{3375}$ or $3375 \wedge (1/3)$

$$\sqrt[3]{3375} = r$$

$\boxed{r = 15m}$

Example 12: A sphere has a volume of 7776π in³, find the diameter.

$$7776\pi = \frac{4}{3}\pi r^3$$

$$5832 = r^3$$

$$\sqrt[3]{5832} = r$$

$$18in = r$$

d=36in