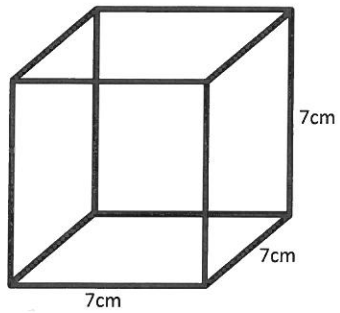
Figure: Cube



Base: Square

Perimeter of the Base (P_B)
$P_B = 4(side)$
$P_B = 4(7)$
$P_B = 28cm$

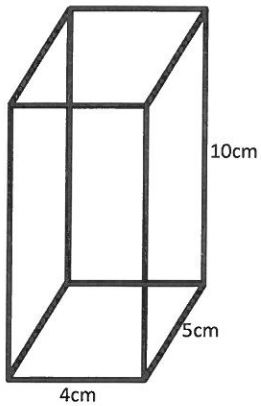
Area of the Base (A_B)
$A_B = side^2(width)$
$A_B = (7)^2$
$A_B = 49cm^2$

Lateral Area (L_A)
$L_A = P_B \cdot H$
$L_A = (28) \cdot (7)$
$L_A = 196cm^2$

Total Surface Area (T_A)
$T_A = L_A + 2A_B$
$T_A = (196) + 2(49)$
$T_A = 196 + 98$
$T_A = 294cm^2$

Volume (V)
$V = A_B \cdot H$
$V = (49) \cdot (7)$
$V = 343cm^3$

Figure: Rectangular Prism



Base: Rectangle

Perimeter of the Base (P_B)
$P_B = 2(length) + 2(width)$
$P_B = 2(5) + 2(4)$
$P_B = 10 + 8$
$P_B = 18cm$

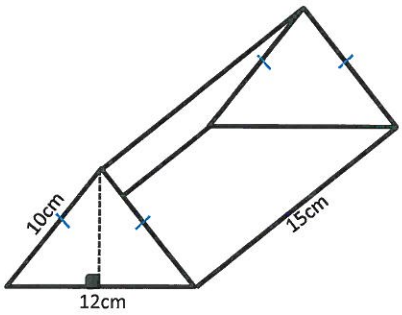
Area of the Base (A_B)
$A_B = (length)(width)$
$A_B = (5)(4)$
$A_B = 20cm^2$

Lateral Area (L_A)
$L_A = P_B \cdot H$
$L_A = (18) \cdot (10)$
$L_A = 180cm^2$

Total Surface Area (T_A)
$T_A = L_A + 2A_B$
$T_A = (180) + 2(20)$
$T_A = 220cm^2$

Volume (V)
$V = A_B \cdot H$
$V = (20) \cdot (10)$
$V = 200cm^3$

Figure: Triangular Prism



Base: Triangle

Perimeter of the Base (P_B)

$P_B = a + b + c$

$P_B = 10 + 12 + 10$

$P_B = 32cm$

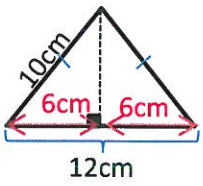
Area of the Base (A_B)

$$A_B = \left(\frac{(base)(height)}{2}\right)$$

$$A_B = \left(\frac{(12)(8)}{2}\right)$$

$$A_B = \left(\frac{96}{2}\right)$$

$A_B = 48cm^2$



Because it is an isosceles triangle we can divide the base in 2 and use Pythagoras to determine the height of the triangle

$$a^2+b^2 = c^2$$

$$6^2 + x^2 = 10^2$$

$$36 + x^2 = 100$$

$$x^2 = 100 - 36$$

$$x^2 = 64$$

$$\sqrt[2]{x} = \sqrt[2]{64}$$

$$x = 8$$

Lateral Area (L_A)

$L_A = P_B \cdot H$

$L_A = (32) \cdot (15)$

$L_A = 480cm^2$

Total Surface Area (T_A)

$T_A = L_A + 2A_B$

$T_A = (480) + 2(48)$

$T_A = 480 + 96$

$T_A = 576cm^2$

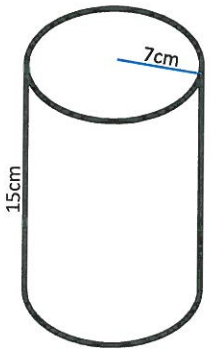
Volume (V)

$V = A_B \cdot H$

$V = (48) \cdot (15)$

$V = 720cm^3$

Figure: Cylinder



Base: Circle

Perimeter of the Base (P_B)

$P_B = \pi d$

$P_B = (3.14)(14)$

$P_B = 43.96cm$

Area of the Base (A_B)

$A_B = \pi r^2$

$A_B = (3.14)(7)^2$

$A_B = (3.14)(49)$

$A_B = 153.86cm^2$

Lateral Area (L_A)

$L_A = P_B \cdot H$

$L_A = (43.96) \cdot (15)$

$L_A = 659.4cm^2$

Total Surface Area (T_A)

$T_A = L_A + 2A_B$

$T_A = (659.4) + 2(153.86)$

$T_A = 659.4 + 307.72$

$T_A = 967.12cm^2$

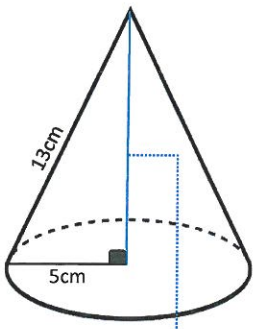
Volume (V)

$V = A_B \cdot H$

$V = (153.86) \cdot (15)$

$V = 2307.9cm^3$

Figure: Cone



Solve for height using Pythagoras.
Pythagorean Triple: (5, 12, 13)

Base: Circle

Perimeter of the Base (P_B)

$P_B = \pi d$

$P_B = (3.14)(10)$

$P_B = 31.4cm$

Area of the Base (A_B)

$A_B = \pi r^2$

$A_B = (3.14)(5)^2$

$A_B = (3.14)(25)$

$A_B = 78.5cm^2$

Lateral Area (L_A)

$L_A = \frac{P_B \cdot slanted}{2}$

$L_A = \frac{(31.4) \cdot (13)}{2}$

$L_A = 204.1cm^2$

Total Surface Area (T_A)

$T_A = L_A + A_B$

$T_A = (204.1) + (78.5)$

$T_A = 282.6cm^2$

Volume (V)

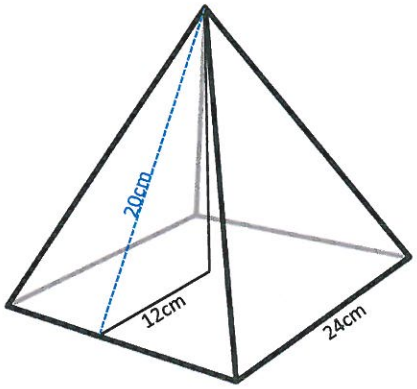
$V = \frac{A_B \cdot H}{3}$

$V = \frac{(78.5) \cdot (12)}{3}$

$V = \frac{942}{3}$

$V = 314cm^3$

Figure: Pyramid



Base: Square

Perimeter of the Base (P_B)

$P_B = 4(side)$

$P_B = 4(24)$

$P_B = 96cm$

Area of the Base (A_B)

$A_B = (side)^2$

$A_B = (24)^2$

$A_B = 576cm^2$

Because there is a square base pyramid was can divide the base length in 2 and use Pythagoras to determine the height of the pyramid

$$a^2+b^2 = c^2$$

$$12^2 + x^2 = 20^2$$

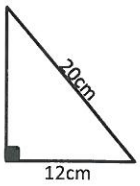
$$144 + x^2 = 400$$

$$x^2 = 400 - 144$$

$$x^2 = 256$$

$$\sqrt[2]{x} = \sqrt[2]{256}$$

$$x = 16$$



Lateral Area (L_A)

$$L_A = \frac{P_B \cdot slanted}{2}$$

$$L_A = \frac{(96)\cdot(20)}{2}$$

$$L_A = 960cm^2$$

Total Surface Area (T_A)

$$T_A = L_A + A_B$$

$$T_A = (960) + (576)$$

$$T_A = 1536cm^2$$

Volume (V)

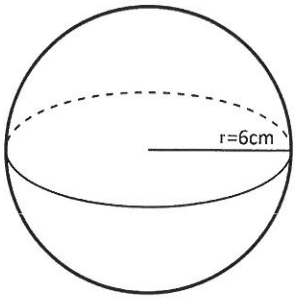
$$V = \frac{A_B \cdot H}{3}$$

$$V = \frac{(576)\cdot(16)}{3}$$

$$V = \frac{9216}{3}$$

$$V = 3072cm^3$$

Figure: Sphere



Base: No Base

Lateral Area = Total Surface Area

Area (A)

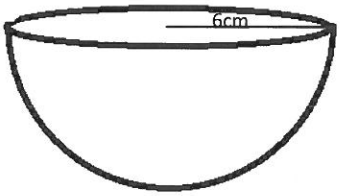
$$A = 4\pi r^2$$
$$A = 4(3.14)(6)^2$$
$$A = 4(3.14)(326)$$
$$A = 452.16cm^2$$

Volume (V)

$$V = \frac{4\pi r^3}{3}$$
$$V = \frac{4(3.14)(6)^3}{3}$$
$$V = \frac{(4)(3.14)(216)}{3}$$
$$V = 904.32cm^3$$

Figure: Hemisphere

Base: Circle



Perimeter of the Base (P_B)

$$P_B = \pi d$$
$$P_B = (3.14)(12)$$
$$P_B = 37.68cm$$

Area of the Base (A_B)

$$A_B = \pi r^2$$
$$A_B = (3.14)(6)^2$$
$$A_B = (3.14)(36)$$
$$A_B = 113.04cm^2$$

Lateral Area (L_A)

$$L_A = 2\pi r^2$$
$$L_A = 2(3.14)(6)^2$$
$$L_A = 2(3.14)(36)$$
$$L_A = 226.08cm^2$$

Total Surface Area (T_A)

$$T_A = L_A + A_B$$
$$T_A = (226.08) + (113.04)$$
$$T_A = 339.12cm^2$$

Volume (V)

$$V = \frac{2\pi r^3}{3}$$
$$V = \frac{2(3.14)(6)^3}{3}$$
$$V = \frac{(2)(3.14)(216)}{3}$$
$$V = 452.16cm^3$$

Area & Volume

	LATERAL AREA	TOTAL SURFACE AREA	VOLUME
RIGHT FIGURES - Cubes - Rectangular prisms - Triangular prisms - Cylinders - Octagonal prisms - etc.	$L_A = P_B \cdot H$	$A_T = L_A + 2A_B$	$V = A_B \cdot H$
CONES & PYRAMIDS	$L_A = \frac{P_B \cdot s}{2}$	$A_T = L_A + A_B$	$V = \frac{A_B \cdot H}{3}$
SPHERE	Lateral area = total surface area $A = 4\pi r^2$		$V = \frac{4\pi r^3}{3}$
HEMISHPERE	$L_A = 2\pi r^2$	$A_T = L_A + A_B$	$V = \frac{2\pi r^3}{3}$

Legend

Base: give the name of the base

P_B = Perimeter of the Base

A_B = Area of the Base

a = apothem

h= height of the base

H = height/length of the figure

s = slanted height

A_L / L_A = Lateral Area

A_T / T_A / TSA = Total Surface Area

V= Volume of the Figure