Calculate the volumes of all the figures below. Use the knowledge that you have!!!

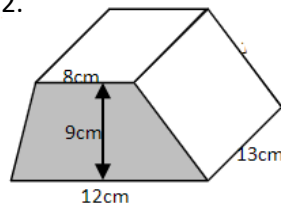**1.**

5 yd
17 yd
3 yd

$V = (bh)\ell$

$V = (17)(5)(3)$

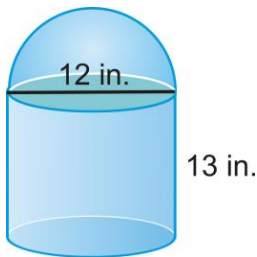$V = 255 \, yd^3$

2.

8cm
9cm
13cm
12cm
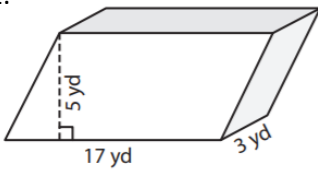
$V = \dfrac{(a+b)h}{2} \times \ell$

$V = \dfrac{(8+12)9}{2} \times 13$

$V = 90 \times 13$

$V = 1170 cm^3$

3.

12 in.

13 in.

Semi-sphere $\Rightarrow V = \dfrac{2\pi r^3}{3}$

$V = \dfrac{2(3.14)(6)^3}{3} \quad ^{216}$

$V = 452.16$

Cylinder $\Rightarrow V = \pi r^2 h$

$V = (3.14)(6)^2 (13) \quad ^{36}$

$V = 1469.52$

Total Volume is $1921.68 in^3$

4.

13 cm = slant

5 cm = radius

= height of cylinder

2 cm = height of cylinder

$r^2 + h^2 = s^2$

$5^2 + h^2 = 13^2$

$25 + h^2 = 169$

$h^2 = 144$

$\boxed{h = 12}$

★ If you used 13 as height, that is fine.

Cone: $V = \dfrac{\pi r^2 h}{3}$

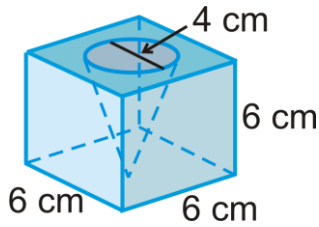$V = \dfrac{(3.14)(5)^2 (12)}{3} \quad ^{25}$

$V = 314$

Cylinder:

$V = \pi r^2 h$

$V = (3.14)(5)^2 (2) \quad ^{25}$

$V = 157$

Total $V = 471 cm^3$

5.

4 cm
6 cm
6 cm   6 cm

$\text{Cube: } V = b^3$

$V = 6^3$

$V = 216 \, cm^3$

$\text{Cone: } V = \dfrac{\pi r^2 h}{3}$

$V = \dfrac{(3.14)(2^{\not 4})(6)}{3}$

$V = 25.12 \, cm^3$

Total Volume
$= 216$
-25.12
$= 190.88 \, cm^3$

6. Square based box with a cylindrical hole.

9 cm
18 cm
48 cm
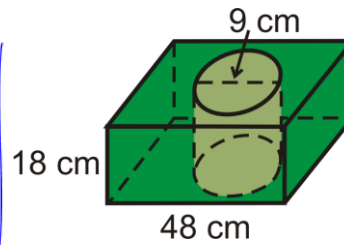
$\text{Box: } V = lwh$

$V = (48)(48)(18)$

$V = 41472 \, cm^3$

$\text{Cylinder: } V = \pi r^2 h$

$V = (3.14)(4\not 9 5^{\,20.25})(18)$

$V = 1144.53$

Total Volume $= 41472 - 1144.53$
$= 40327.47 \, cm^3$

7.

42
81 ft.
39 ft.
39 ft   39

$\text{Cone: } V = \dfrac{\pi r^2 h}{3}$

$V = \dfrac{(3.14)(3\not 9^{\,1521})(42)}{3}$
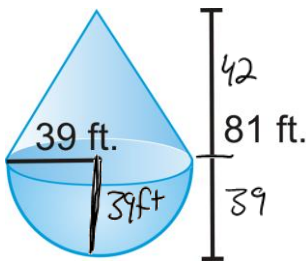
$V = 66863.16$

$\text{Semi-Sphere: } V = \dfrac{2\pi r^3}{3}$

$V = \dfrac{2(3.14)(3\not 9^{\,59319})}{3}$

$V = 124,174.44$

Total Volume $= 191,037.6 \, ft^3$

8.

35 cm
42 cm
9 cm
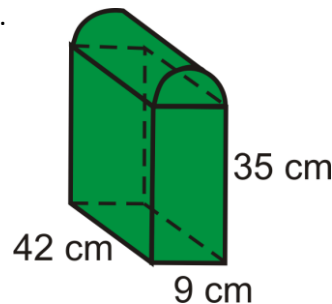
$\text{Box: } V = lwh$

$V = (42)(9)(35)$

$V = 13,230 \, cm^3$

$\text{Semi Cylinder: } V = \dfrac{\pi r^2 h}{2}$

$V = \dfrac{(3.14)(4\not 5^{\,20.25})(42)}{2}$

$V = 1335.29 \, cm^3$

Total Volume $= 14565.29 \, cm^3$

9. Tennis balls with a 3 inch diameter are sold in cans of three. The can is a cylinder. Assume the balls touch the can on the sides, top and bottom.
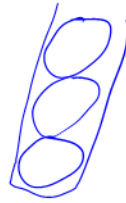
a) What is the volume of one tennis ball?

$r = 1.5$

$$V = \frac{4\pi r^3}{3}$$
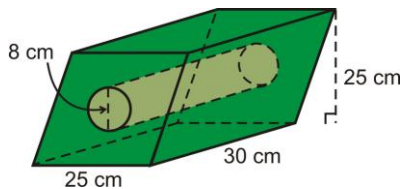
$$V = \frac{4(3.14)(\cancel{3.375})}{3}$$

$$V = 14.13 \text{ in}^3$$

b) What is the volume of the space not occupied by the tennis balls?

Cylinder: $V = \pi r^2 h$

$$V = (3.14)(\cancel{2.25})(9) \quad \text{← diameter of 3 balls}$$

$$V = 63.59 \text{ in}^3$$

Empty space: $V = 63.59 - 3(14.13)$

$$V = 21.2 \text{ in}^3$$

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10. Cut out the cylinder.
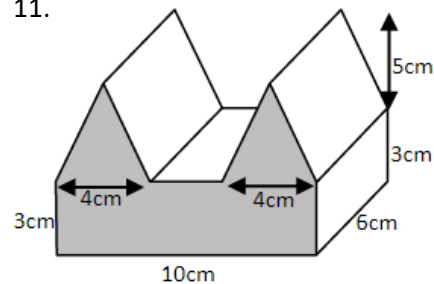
8 cm, 25 cm, 30 cm, 25 cm

Parallelogram: $V = bhl$

$$V = (25)(25)(30)$$

$$V = 18750 \text{ cm}^3$$

Cylinder: $V = \pi r^2 h$

$$V = (3.14)(4)^2(30)$$

$$V = 1507.2 \text{ cm}^3$$

Total $V = 17242.8 \text{ cm}^3$

11.

5cm, 3cm, 4cm, 4cm, 3cm, 6cm, 10cm

Bottom Box: $V = \ell w h$

$$V = (10)(6)(3)$$

$$V = 180 \text{ cm}^3$$

Two Triangle Tops: $V = \cancel{2}\left(\frac{bhl}{\cancel{2}}\right)$

$$V = (4)(5)(6)$$

$$V = 120 \text{ cm}^3$$

Total $V = 300 \text{ cm}^3$

Find the surface area of each figure. Careful with the formulas as not all parts need to be covered....

12.

12 in.

13 in.

SA of Semi Sphere:

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

$$SA = 2(3.14)(6^2)\quad ^{36}$$

$$SA = 226.08 \text{ in}^2$$

only one circle, the bottom

SA of Cyindr

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

$$= (3.14)(6)^2 + 2(3.14)(6)(13)$$

$$= 113.04 + 489.84$$

$$= 602.88 \text{ in}^2$$

Total SA = 828.96 in²

13.

25 cm

18 cm

48 cm

4 identical rectangles on the sides.
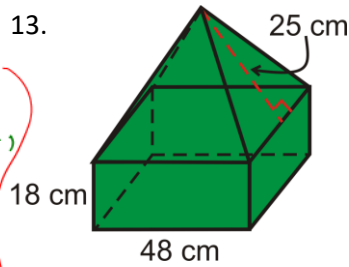
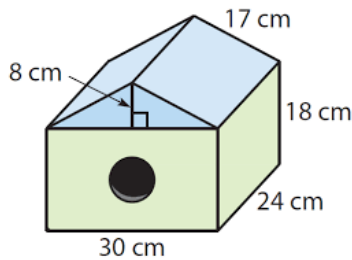Pyramid – bottom:

$$SA = 2bs$$
$$= 2(48)(25)$$
$$= 2400 \text{ cm}^2$$

Box – Top:

$$SA = (48)(48) + 4((18)(48)$$
$$= 2304 + 3456$$
$$= 5760 \text{ cm}^2$$

Total SA = 8160 cm²

14. Hole is only on one side, with diameter of 8 cm.

17 cm

8 cm

18 cm

24 cm

30 cm

Box – top:

$$SA = (30)(24) + 2(24)(18) + 2(30)(18)$$
$$= 2664 \text{ cm}^2$$

Triangular Prism – Bottom:

$$SA = bh + A + B$$
$$= (30)(8) + (17)(24) + (17)(24)$$
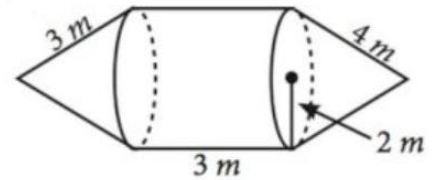$$= 1056 \text{ cm}^2$$

Hole:

$$SA = \pi r^2$$
$$= (3.14)(4)^2$$
$$= 50.24 \text{ cm}^2$$

Total SA = 2664 + 1056 − 50.24
= 3669.76 cm²

15.

3 m

4 m

2 m

3 m

Cylinder – circles:

$$SA = 2\pi r h$$
$$= 2(3.14)(2)(3)$$
$$= 37.68 \text{ m}^2$$

2 Cones – circles:

SA = left cone + right cone

$$SA = (3.14)(2)(3) + (3.14)(2)(4)$$
$$SA = 43.96 \text{ m}^2$$

Total SA = 81.64 m²