Volume

① Cuboids, Cylinders and Prisms.

Calculating.

1a) $V = l \times b \times h$
$= 7 \times 4 \times 5$
$= 140\,cm^3$

b) $V = \pi r^2 h$
$= \pi \times 1^2 \times 5.$
$= 15.7\,cm^3$

c) $V = Ah$
$= \frac{1}{2} \times 4 \times 3 \times 2.5$
$= 15\,cm^3$

Reverse Volume

1a) $V = \pi r^2 h$
$800 = \pi r^2 \times 12$

$12\pi r^2 = 800$
$r^2 = \frac{800}{12\pi}$
$r = \sqrt{\frac{800}{12\pi}} = 4.6cm$

b) $V = \pi r^2 h$
$800 = \pi \times 7^2 \times h$

$49\pi h = 800$
$h = \frac{800}{49\pi} = 5.20cm$

2. $V = \pi r^2 h$

$160 = \pi \times r^2 \times 9$

$9\pi r^2 = 160$

$r^2 = \frac{160}{9\pi}$

$r = \sqrt{\frac{160}{9\pi}} = 2.3788\,cm$

$\theta = 4.76cm$

3. $V_{cube} = l \times b \times h$
$= 4 \times 4 \times 4 = 64cm^3$

$V_{cylinder} = \pi r^2 h$

$64 = \pi \times 2.5^2 \times h$

$6.25\pi h = 64$

$h = \frac{64}{6.25\pi} = 3.26cm$

4. $V_A = l \times b \times h$
$= 10 \times 12 \times 7 = 840cm^3$

$V_B = \pi r^2 h$

$840 = \pi \times 7^2 \times h$

$49\pi h = 840$

$h = \frac{840}{49\pi} = 5.5cm$

② Pyramids, Cones and Spheres

Calculating.

1a) $V = \frac{4}{3} \times r^3$

$= \frac{4}{3} \times \pi \times 7^3$

$= 1436.76 cm^3$

b) $V = \frac{1}{2} \times \frac{4}{3} \times r^3$.

$= \frac{1}{2} \times \frac{4}{3} \times \pi \times 12^3$

$= 3619.11 cm^3$

c) $V = \frac{1}{3} Ah$

$= \frac{1}{3} \times 6 \times 6 \times 7$

$= 84 cm^3$

d) $V = \frac{1}{3} Ah$

$= \frac{1}{3} \times \frac{1}{2} \times 5 \times 5.6 \times 11$

$= 51.3 cm^3$.

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

$= 5^2 + (2.5)^2$

$a = \sqrt{31.25} = 5.6cm$

e) $V = \frac{1}{3} \times r^3 h$

$= \frac{1}{3} \times \pi \times 3^3 \times 7$

$= 197.92 cm^3$

f) $V_{large\ cone} = \frac{1}{3} \times r^3 h$

$= \frac{1}{3} \times \pi \times 4^3 \times 12$

$= 804.25 cm^3$

$V_{small\ cone} = \frac{1}{3} \times r^3 h$

$= \frac{1}{3} \times \pi \times 1.5^3 \times 3$

$= 10.6 cm^3$

$V_{frustum} = 804.25 - 10.6 = 793.65 cm^3$

Reverse

1. $V_{cuboid} = l \times b \times h$

$= 15 \times 18 \times 13$

$= 3510 cm^3$

$V_{sphere} = \frac{4}{3} \times r^3$

$3510 = \frac{4}{3} \times \pi \times r^3$.

$\frac{4}{3} \times r^3 = 3510$

$r^3 = \frac{3510 \times 3}{4\pi}$

$r = \sqrt[3]{\frac{3510 \times 3}{4\pi}}$

$= 9.43cm.$

2. $V_{cone} = \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \pi \times 3^3 \times 12$

$= 339.29 cm^3$

$V_{cylinder} = \pi r^2 h$

$339.29 = \pi \times 4^2 \times h$

$16\pi h = 339.29$

$h = \frac{339.29}{16\pi} = 6.75 cm$

3a) $V_{cuboid} = lbh$

$= 12 \times 17 \times 28$

$= 5712 cm^3$

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

$= \frac{4}{3} \times \pi \times 12^3$

$= 7238.23 cm^3$.

$V_{\frac{1}{4}sphere} = 7238.23 \div 4 = 1809.56 cm^3$

$V_{bread\ bin} = 5712 + 1809.56 = 7512.56 cm^3$

b) $V_{pyramid} = \frac{1}{3}Ah$

$1809.56 = \frac{1}{3} \times x \times 12 \times 28$

$112x = 1809.56$

$x = 16.16 cm$.

③ Composite Volume

1. $V_{cone} = \frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \pi \times 4^3 \times 12$

$= 804.25 cm^3$

$V_{hemisphere} = \frac{1}{2} \times \frac{4}{3}\pi r^3$

$= \frac{1}{2} \times \frac{4}{3} \times \pi \times 4^3$

$= 134.04 cm^3$

$V_{total} = 804.25 + 134.04 = 938.29 \approx 938 cm^3$.

2. $V_{cylinder1} = \pi r^2 h$.

$= \pi \times 8^2 \times 3.375$

$= 678.58 mm^3$

$V_{new} = V_{cylinder2} + V_{sphere}$.

$= \pi r^2 h + \frac{4}{3}\pi r^3$

$678.58 = \pi \times 3^2 \times h + \left(\frac{4}{3} \times \pi \times 3^3\right)$

$678.58 = 9\pi h + 36\pi$.

$9\pi h = 678.58 - 36\pi$

$h = \frac{678.58 - 36\pi}{9\pi} = 20mm$.

3. $V_{cuboid} = lbh$

$= 16 \times 13 \times 8$

$= 1664 cm^3$

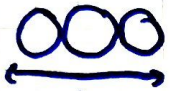
$V_{cylinder} = \pi r^2 h$

$= \pi \times 5^2 \times 8$

$= 628.32 cm^3$

$V_{remaining} = 1664 - 628.32 = 1035.68 cm^3$

4.

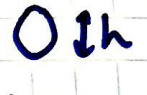


l

$6.8 \times 3 = 20.4 cm$

b

$6.8 \times 2 = 13.6 cm$



h

$6.8 cm$

$V = lbh$

$= 20.4 \times 13.6 \times 6.8$

$= 1886.59 cm^3$