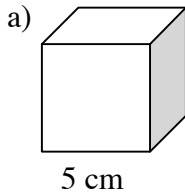


## Volume and Surface Area

### 1. Cube



$$V = s^3$$

$$V = (5\text{ cm})^3$$

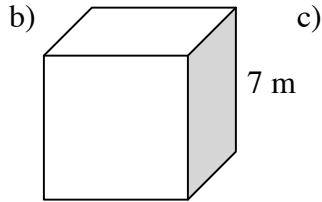
$$V = 125\text{ cm}^3$$

$$SA = 6s^2$$

$$SA = 6(5\text{ cm})^2$$

$$SA = 6 \cdot 25\text{ cm}^2$$

$$SA = 150\text{ cm}^2$$



$$V = s^3$$

$$V = (7\text{ m})^3$$

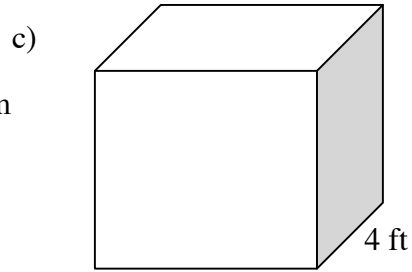
$$V = 343\text{ m}^3$$

$$SA = 6s^2$$

$$SA = 6(7\text{ m})^2$$

$$SA = 6 \cdot 49\text{ m}^2$$

$$SA = 294\text{ m}^2$$



$$V = s^3$$

$$V = (4\text{ ft})^3$$

$$V = 64\text{ ft}^3$$

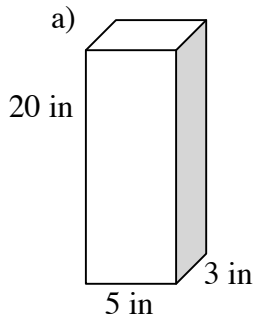
$$SA = 6s^2$$

$$SA = 6(4\text{ ft})^2$$

$$SA = 6 \cdot 16\text{ ft}^2$$

$$SA = 96\text{ ft}^2$$

### 2. Rectangular Solid



$$V = lwh$$

$$V = 5\text{ in} \cdot 3\text{ in} \cdot 20\text{ in}$$

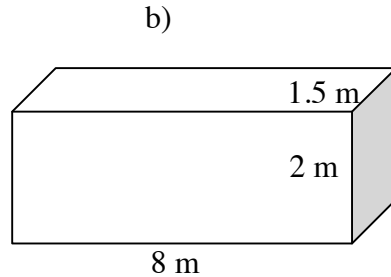
$$V = 300\text{ in}^3$$

$$SA = 2lw + 2wh + 2lh$$

$$SA = 2 \cdot 5\text{ in} \cdot 3\text{ in} + 2 \cdot 3\text{ in} \cdot 20\text{ in} + 2 \cdot 5\text{ in} \cdot 20\text{ in}$$

$$SA = 30\text{ in}^2 + 120\text{ in}^2 + 200\text{ in}^2$$

$$SA = 350\text{ in}^2$$



$$V = lwh$$

$$V = 8\text{ m} \cdot 1.5\text{ m} \cdot 2\text{ m}$$

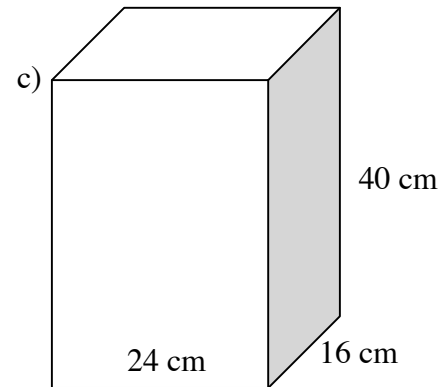
$$V = 24\text{ m}^3$$

$$SA = 2lw + 2wh + 2lh$$

$$SA = 2 \cdot 8\text{ m} \cdot 1.5\text{ m} + 2 \cdot 1.5\text{ m} \cdot 2\text{ m} + 2 \cdot 8\text{ m} \cdot 2\text{ m}$$

$$SA = 24\text{ m}^2 + 6\text{ m}^2 + 32\text{ m}^2$$

$$SA = 62\text{ m}^2$$



$$V = lwh$$

$$V = 24\text{cm} \cdot 16\text{cm} \cdot 40\text{cm}$$

$$V = 15,360\text{cm}^3$$

$$SA = 2lw + 2wh + 2lh$$

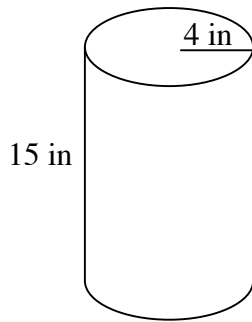
$$SA = 2 \cdot 24\text{cm} \cdot 16\text{cm} + 2 \cdot 16\text{cm} \cdot 40\text{cm} + 2 \cdot 24\text{cm} \cdot 40\text{cm}$$

$$SA = 768\text{cm}^2 + 1280\text{cm}^2 + 1920\text{cm}^2$$

$$SA = 3968\text{cm}^2$$

### 3. Cylinder

a)



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

$$V = \pi(4\text{in})^2 \cdot 15\text{in}$$

$$V = \pi \cdot 16\text{in}^2 \cdot 15\text{in}$$

$$V = 240\pi\text{in}^3$$

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

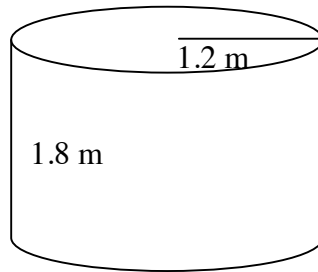
$$SA = 2\pi(4\text{in})^2 + 2\pi(4\text{in})(15\text{in})$$

$$SA = 2\pi \cdot 16\text{in}^2 + 2\pi \cdot 60\text{in}^2$$

$$SA = 32\pi\text{in}^2 + 120\pi\text{in}^2$$

$$SA = 152\pi\text{in}^2$$

b)



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

$$V = \pi(1.2\text{m})^2 \cdot 1.8\text{m}$$

$$V = \pi \cdot 1.44\text{m}^2 \cdot 1.8\text{m}$$

$$V = 2.592\pi\text{m}^3$$

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

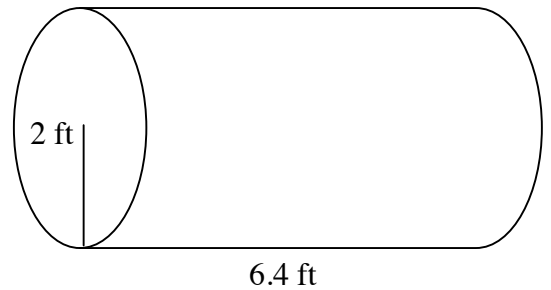
$$SA = 2\pi(1.2\text{m})^2 + 2\pi(1.2\text{m})(1.8\text{m})$$

$$SA = 2\pi \cdot 1.44\text{m}^2 + 2\pi \cdot 2.16\text{m}^2$$

$$SA = 2.88\pi\text{m}^2 + 4.32\pi\text{m}^2$$

$$SA = 7.2\pi\text{m}^2$$

c)



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

$$V = \pi(2\text{ft})^2 \cdot 6.4\text{ft}$$

$$V = \pi \cdot 4\text{ft}^2 \cdot 6.4\text{ft}$$

$$V = 25.6\pi\text{ft}^3$$

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

$$SA = 2\pi(2\text{ft})^2 + 2\pi(2\text{ft})(6.4\text{ft})$$

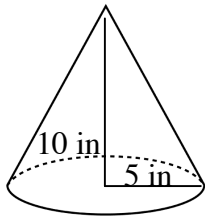
$$SA = 2\pi \cdot 4\text{ft}^2 + 2\pi \cdot 12.8\text{ft}^2$$

$$SA = 8\pi\text{ft}^2 + 25.6\pi\text{ft}^2$$

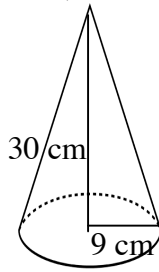
$$SA = 33.6\pi\text{ft}^2$$

4. Cone

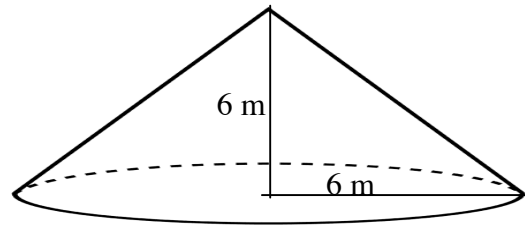
a)



b)



c)



$$s = \sqrt{h^2 + r^2}$$

$$s = \sqrt{(10\text{in})^2 + (5\text{in})^2}$$

$$s = \sqrt{100\text{in}^2 + 25\text{in}^2}$$

$$s = \sqrt{125\text{in}^2}$$

$$s = 11.18\text{in}$$

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

$$V = \frac{1}{3}\pi(5\text{in})^2 \cdot 10\text{in}$$

$$V = \frac{1}{3}\pi \cdot 25\text{in}^2 \cdot 10\text{in}$$

$$V = \frac{250}{3}\pi\text{in}^3$$

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

$$SA = \pi(5\text{in})^2 + \pi \cdot 5\text{in} \cdot 11.18\text{in}$$

$$SA = \pi \cdot 25\text{in}^2 + \pi \cdot 55.9\text{in}^2$$

$$SA = 80.9\pi\text{in}^2$$

$$s = \sqrt{h^2 + r^2}$$

$$s = \sqrt{(30\text{cm})^2 + (9\text{cm})^2}$$

$$s = \sqrt{900\text{cm}^2 + 81\text{cm}^2}$$

$$s = \sqrt{981\text{cm}^2}$$

$$s = 31.32\text{cm}$$

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

$$V = \frac{1}{3}\pi(9\text{cm})^2 \cdot 30\text{cm}$$

$$V = \frac{1}{3}\pi \cdot 81\text{cm}^2 \cdot 30\text{cm}$$

$$V = 810\pi\text{cm}^3$$

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

$$SA = \pi(9\text{cm})^2 + \pi \cdot 9\text{cm} \cdot 31.32\text{cm}$$

$$SA = \pi \cdot 81\text{cm}^2 + \pi \cdot 281.88\text{cm}^2$$

$$SA = 362.88\pi\text{cm}^2$$

$$s = \sqrt{h^2 + r^2}$$

$$s = \sqrt{(6\text{m})^2 + (6\text{m})^2}$$

$$s = \sqrt{36\text{m}^2 + 36\text{m}^2}$$

$$s = \sqrt{72\text{m}^2}$$

$$s = 8.49\text{m}$$

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

$$V = \frac{1}{3}\pi(6\text{m})^2 \cdot 6\text{m}$$

$$V = \frac{1}{3}\pi \cdot 36\text{m}^2 \cdot 6\text{m}$$

$$V = 72\pi\text{m}^3$$

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

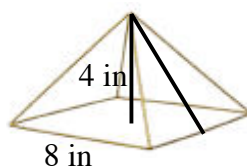
$$SA = \pi(6\text{m})^2 + \pi \cdot 6\text{m} \cdot 8.49\text{m}$$

$$SA = \pi \cdot 26\text{m}^2 + \pi \cdot 50.94\text{m}^2$$

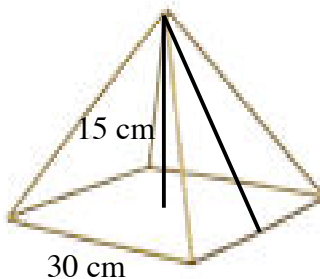
$$SA = 76.94\pi\text{m}^2$$

5. Pyramid

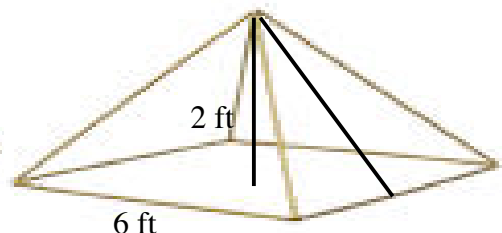
a)



b)



c)



$$s = \sqrt{h^2 + (b/2)^2}$$

$$s = \sqrt{(4in)^2 + (4in)^2}$$

$$s = \sqrt{16in^2 + 16in^2}$$

$$s = \sqrt{32in^2}$$

$$s = 5.66in$$

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

$$V = \frac{1}{3}(8in)^2 \cdot 4in$$

$$V = \frac{1}{3} \cdot 64in^2 \cdot 4in$$

$$V = \frac{256}{3}in^3$$

$$SA = b^2 + 2bs$$

$$SA = (8in)^2 + 2 \cdot 8in \cdot 5.66in$$

$$SA = 64in^2 + 90.56in^2$$

$$SA = 154.56in^2$$

$$s = \sqrt{h^2 + (b/2)^2}$$

$$s = \sqrt{(15cm)^2 + (15cm)^2}$$

$$s = \sqrt{225cm^2 + 225cm^2}$$

$$s = \sqrt{450cm^2}$$

$$s = 21.21cm$$

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

$$V = \frac{1}{3}(30cm)^2 \cdot 15cm$$

$$V = \frac{1}{3} \cdot 900cm^2 \cdot 15cm$$

$$V = 4500cm^3$$

$$SA = b^2 + 2bs$$

$$SA = (30cm)^2 + 2 \cdot 30cm \cdot 21.21cm$$

$$SA = 900cm^2 + 1272.6cm^2$$

$$SA = 2172.6cm^2$$

$$s = \sqrt{h^2 + (b/2)^2}$$

$$s = \sqrt{(2ft)^2 + (3ft)^2}$$

$$s = \sqrt{4ft^2 + 9ft^2}$$

$$s = \sqrt{13ft^2}$$

$$s = 3.6ft$$

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

$$V = \frac{1}{3}(6ft)^2 \cdot 2ft$$

$$V = \frac{1}{3} \cdot 36ft^2 \cdot 2ft$$

$$V = 24ft^3$$

$$SA = b^2 + 2bs$$

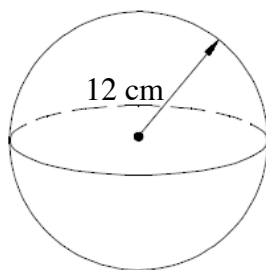
$$SA = (6ft)^2 + 2 \cdot 6ft \cdot 3.6ft$$

$$SA = 36ft^2 + 43.2ft^2$$

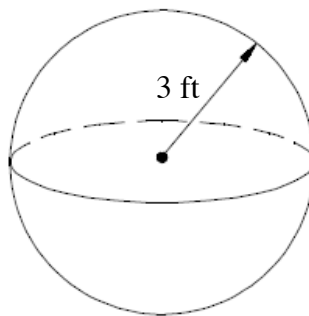
$$SA = 79.2ft^2$$

## 6. Sphere

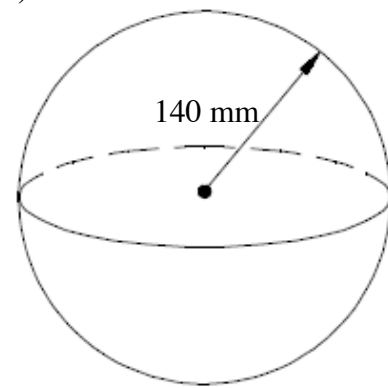
a)



b)



c)



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

$$V = \frac{4}{3}\pi(12\text{cm})^3$$

$$V = \frac{4}{3}\pi \cdot 1728\text{cm}^3$$

$$V = \frac{6912}{3}\pi\text{cm}^3$$

$$SA = 4\pi r^2$$

$$SA = 4\pi(12\text{cm})^2$$

$$SA = 4\pi \cdot 144\text{cm}^2$$

$$SA = 576\pi\text{cm}^2$$

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

$$V = \frac{4}{3}\pi(3\text{ft})^3$$

$$V = \frac{4}{3}\pi \cdot 27\text{ft}^3$$

$$V = 36\pi\text{ft}^3$$

$$SA = 4\pi r^2$$

$$SA = 4\pi(3\text{ft})^2$$

$$SA = 4\pi \cdot 9\text{ft}^2$$

$$SA = 36\pi\text{ft}^2$$

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

$$V = \frac{4}{3}\pi(140\text{mm})^3$$

$$V = \frac{4}{3}\pi \cdot 2,744,000\text{mm}^3$$

$$V = \frac{10,976,000}{3}\pi\text{mm}^3$$

$$SA = 4\pi r^2$$

$$SA = 4\pi(140\text{mm})^2$$

$$SA = 4\pi \cdot 19,600\text{mm}^2$$

$$SA = 78,400\pi\text{mm}^2$$