

Satellite Dish

$SA = \frac{4\pi r^2}{2}$
 $\rightarrow SA = \frac{4\pi 14^2}{2}$
 $= 1,232 \text{ mm}^2$

$SA = \pi (r_1)^2 - \pi (r_2)^2$
 $SA = \pi 14^2 - \pi 13^2$
 $= 85 \text{ mm}^2$

$SA = \frac{4\pi r^2}{2}$ — base area of cylinder
 $SA = \frac{4\pi 13^2}{2} = 28$
 $= 2,096 \text{ mm}^2$

Volume of satellite dish (•••)

a) $V = \left(\frac{4}{3}\pi r^2\right) / 2$

b) $V = \left(\frac{4}{3}\pi r^2\right) / 2$

Total $V = a - b$

a) $V = \left(\frac{4}{3}\pi 14^2\right) / 2$
 $= 411$

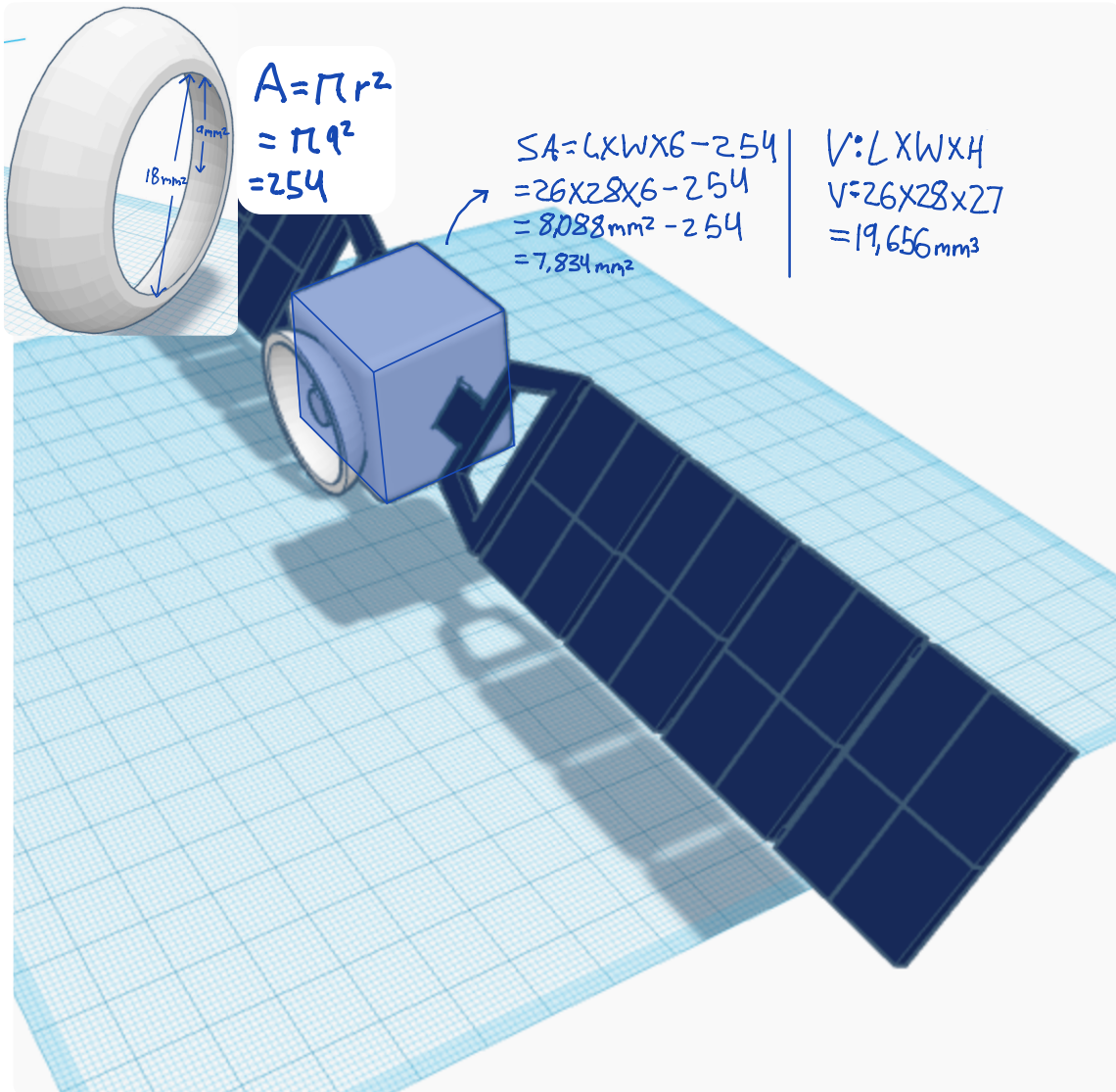
b) $V = \left(\frac{4}{3}\pi 13^2\right) / 2$
 $= 354$

Total $V = 411 - 354$
 $= 57 \text{ mm}^3$

$V = (\pi r^2) h$
 $V = (\pi 3^2) 5$
 $= 141 \text{ mm}^3$

$SA = 2\pi r^2 + 2\pi r h$
 $SA = 2\pi 3^2 + 2\pi(3)(5)$
 $= 151 \text{ mm}^2$

Satellite Body



Solar Array

$$\text{Outer SA} = \frac{1}{2} \times h(a+b) + (L \times W)_{\text{Top}} + (L \times W)_{\text{Bottom}} + (L \times W)_{\text{Side 1}} + (L \times W)_{\text{Side 2}}$$

$$\text{Inner SA} = \frac{1}{2} \times h(a+b) + (L \times W)_{\text{Top}} + (L \times W)_{\text{Bottom}} + (L \times W)_{\text{Side 1}} + (L \times W)_{\text{Side 2}}$$

SA outer - SA inner

$$\text{a) SA} = 2 \left(\frac{1}{2} \times 14(21+31) \right) + (21 \times 2) + (31 \times 2) + (14 \times 2) + (14 \times 2) = 888 \text{ mm}^2$$

$$\text{b) SA} = 2 \left(\frac{1}{2} \times 9(16+23) \right) + (16 \times 2) + (23 \times 2) + (9 \times 2) + (9 \times 2) = 290$$

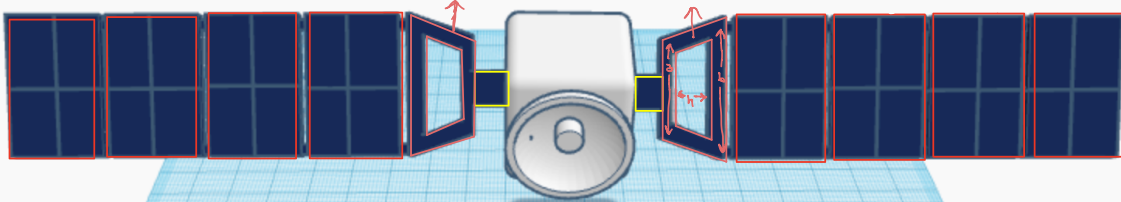
$$\text{Total SA} = a - b = 888 - 290 = 598 \text{ mm}^2$$

$$V = \frac{1}{2} \times h(a+b) \times \text{Length of entire prism}$$

$$\text{a) } V = \frac{1}{2} \times 14(21+31) \times 2 = 728 \text{ mm}^3$$

$$\text{b) } V = \frac{1}{2} \times 9(16+23) \times 2 = 351 \text{ mm}^3$$

$$\text{Total V} = a - b = 728 - 351 = 377 \text{ mm}^3$$



$$\begin{array}{l|l} V = L \times W \times h & SA = L \times W \times 6 \\ V = 20 \times 31 \times 2 & SA = 20 \times 31 \times 6 \\ = 1,240 \text{ mm}^3 & = 3,720 \text{ mm}^2 \end{array}$$

$$\begin{array}{l|l} V = L \times W \times h & SA = L \times W \times 6 \\ V = 6 \times 7 \times 2 & = 6 \times 7 \times 6 \\ = 84 \text{ mm}^3 & = 252 \text{ mm}^2 \end{array}$$

Total SA:

$$1,232 + 85 + 2,096 + 151 + 7,834 + 598 + 3,720 + 252 = 15,968 \text{ mm}^2$$

Total V:

$$57 + 141 + 19,656 + 377 + 1,240 + 84 = 21,555 \text{ mm}^3$$

Total Surface Area = 15,968 mm²

Total Volume = 21,555 mm³

Ratio Surface Area: Volume = 0.74:1

$$\text{Ratio SA:V} = 15,716 : 21,471$$

$$= \frac{15,968}{21,555} \div \frac{21,555}{21,555}$$

$$= \frac{0.74}{1}$$

$$= 0.74:1$$