SHIPPING OPTIMAL CANDLES

$V_T = 21\,715.2\ cm^3$

$V_{candle} = \frac{21\,715.2\ cm^3}{64} = 339.3\ cm^3$

Cylinder

$V = A_b h$

$339.3 = \pi x^2 (4x)$

$\frac{339.3}{4\pi} = \frac{4\pi x^3}{4\pi}$

$27 = x^3$

$\sqrt[3]{27} = x$

$x = 3\ cm$

$r = 3\ cm$

and $h = 4x = 12\ cm$

$A_l = P_b h$

$= 2\pi r h$

$= 2\pi (3\ cm)(12\ cm)$

$= 226.2\ cm^2$

Prism

$V = A_b h$

$339.3 = y^2 z$

$339.3 = y^2 \left(\frac{56.55}{y}\right)$

$339.3 = \frac{56.55y^2}{y}$

$339.3 = 56.55y$

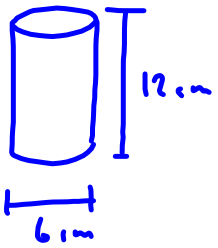
$y = \frac{339.3}{56.55} = 6\ cm$

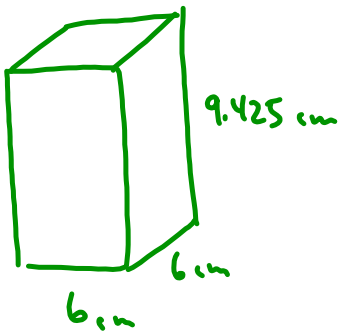
$A_l = P_b h$

$\frac{226.2}{4y} = \frac{4yz}{4y}$

$\frac{56.55}{y} = z$

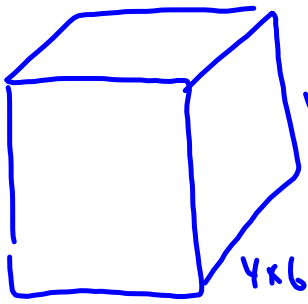
$z = \frac{56.55}{6} = 9.425\ cm$





Box

Cube is best shape. Closest is 4×4×4 candles.



$SA = 2A_b + P_b h$

$= 2(24\text{ cm})^2 + 4(24\text{ cm})(48\text{ cm})$

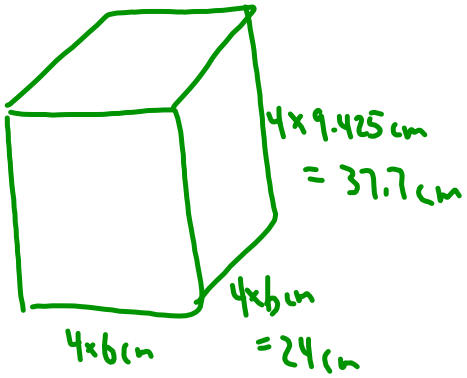
$= 1152\text{ cm}^2 + 4608\text{ cm}^2$

$= 5760\text{ cm}^2$

Cost $= 5760\text{ cm}^2 \times \$0.001/\text{cm}^2$

$= \$5.76$

Box



$SA = 2A_b + P_b h$

$= 2(24\text{ cm})^2 + 4(24\text{ cm})(37.7\text{ cm})$

$= 1152\text{ cm}^2 + 3619.2\text{ cm}^2$

$= 4771.20\text{ cm}^2$

Cost $= \$6.49$