Why are batteries/pop cans cylinders?

- easy to hold
- easy to manufacture
- structural strength

For a fixed volume, the cylinder will reduce surface area.

Comparing prisms/cylinders:

$V = A_b \cdot h$

fixed, fixed, must be the same

$SA = 2A_b + A_l$

$= 2A_b + P_b \cdot h$

fixed, same

minimizing perimeter, minimizes SA and circle is best

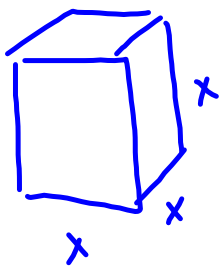
Given equivalent rectangular prisms, which dimensions will produce the smallest surface area?

CUBE!

Since square will minimize perimeter of base

A rectangular prism has a volume of 9261cm^3, what is the minimum surface area?

cube



$V = x^3$

$9261\,cm^3 = x^3$

$\sqrt[3]{9261\,cm^3} = x$

$x = 21\,cm$

$SA = 2A_b + A_l$

$= 2A_b + P_b h$

$= 6x^2$ ← for cube

$= 6(21\,cm)^2$

$= 2646\,cm^2$

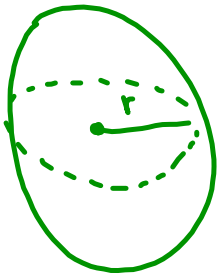
Given any equivalent solids, which solid will produce the smallest surface area?

SPHERE

$V = \frac{4}{3}\pi r^3$ $SA = 4\pi r^2$

A solid has a surface area of 804 dm^2. What is the maximum volume of the solid?

sphere



$SA = 4\pi r^2$

$\frac{804\ dm^2}{4} = \frac{4\pi r^2}{4}$

$201\ dm^2 = \pi r^2$

$\frac{201\ dm^2}{\pi} = \frac{\pi r^2}{\pi}$

$63.98\ dm^2 = r^2$

$r = \sqrt{63.98\ dm^2}$

$r = 8\ dm$

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

$= \frac{4}{3}\pi (8\ dm)^3$

$= 2144.7\ dm^3$

p.125 #1-4

online assignment