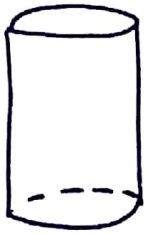
February 22

GUIDED NOTES: Geometric Modeling

r = 2

EX1. Determine the surface area of a cylindrical glass with a height of 6 inches and a diameter of 4 inches.



1 circle

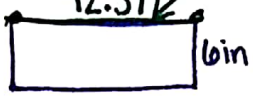
1 rectangle

base: circle

$A = \pi \cdot 2^2$

$A = 12.57$

rectangle:



$C = 2 \cdot \pi \cdot 2$

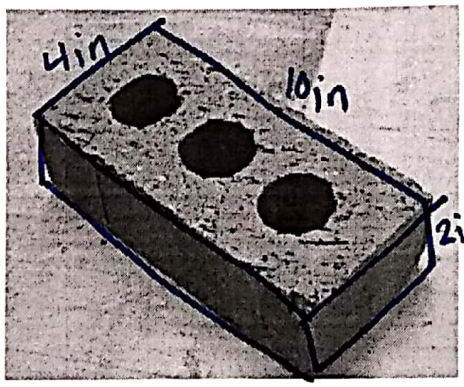
$C = 12.57$

$A = 12.57 \cdot 6$

$A = 75.40$

$SA = 12.57 + 75.40 = \boxed{87.96 \text{ in}^2}$

2. A brick has a length of 10 inches, a width of 4 inches, and a height of 2 inches. There are three identical cylinders with a radius of 1 inch missing out of the middle of the brick. Determine the volume of the brick.



Volume of Brick

base: rectangle

$A = 10 \cdot 4$

$A = 40$

$V = 40 \cdot 2$

$V = 80$

Volume of Cylinders

base: circle

$A = \pi \cdot 1^2$

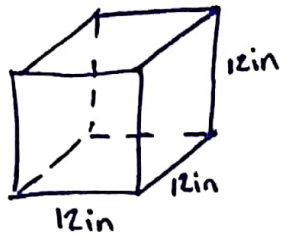
$A = 3.14$

$V = 3.14 \cdot 2$

$V = 6.28$ ← (3)

$80 - 3 \cdot 628 = \boxed{61.15 \text{ in}^3}$

EX3. Eight wooden spheres, each with a radius of 3 inches, are packed snugly into a square box that is 12 inches on one side. The remaining space is filled with packing beads. What is the volume occupied by the packing beads?



Volume of Box

$A = 12 \cdot 12$

$A = 144$

$V = 144 \cdot 12$

$V = 1728$

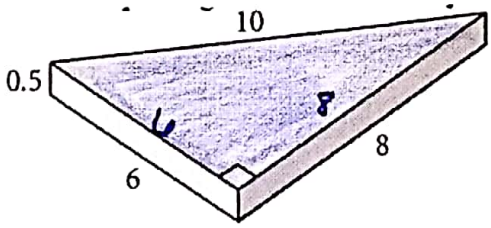
Volume of Spheres

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

$V = 113.10$ ← ⑧

$1728 - 8 \cdot 113.10 = \boxed{823.22 in^3}$

EX4. You are producing 500 of these metal wedges, and you must electroplate them with a thin layer of high-conducting silver (surface area). The measurements shown are in centimeters. Find the total cost for silver, if silver plating costs \$3 for every 200 square centimeters.



base: triangle

$A = \frac{1}{2} \cdot 6 \cdot 8$

$A = 24$ ← ②

rectangles:

$A = 10 \cdot 0.5 = 5$

$A = 6 \cdot 0.5 = 3$

$A = 8 \cdot 0.5 = 4$

$SA = 2 \cdot 24 + 5 + 3 + 4 = 60 cm^2$

$60 \cdot 500 = 30{,}000 cm^2$

$30{,}000 \div 200 = 150$ chunks that are $200 cm^2$

$150 \cdot 3 = \boxed{\$450}$