

Good afternoon: we will randomize when the bell rings and work on these two problems together. Write them down now to save time.

1. Find the radius of a cone with height 8cm and volume $96\pi \text{ cm}^3$.

2. Find the volume of a cylinder with surface area $48\pi \text{ in}^2$ and radius 3 in.

Reminders:
first Q4 assessment: Thursday 3/29

don't worry, we will finish the
coin carpet problem later today!

1. Find the radius of a cone with height 8cm and volume $96\pi \text{ cm}^3$.

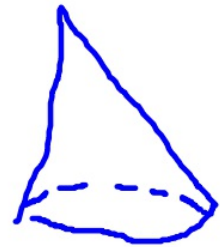
$$V = \frac{1}{3} \pi r^2 \cdot 8 = 96\pi$$

$$\frac{\frac{1}{3} \pi r^2 \cdot 8}{8} = \frac{96\pi}{8}$$

$$3 \left(\frac{1}{3} \pi r^2 \right) = (12\pi) 3$$

$$\frac{\pi r^2}{\pi} = \frac{36\pi}{\pi} \rightarrow r^2 = 36$$

$$r = 6 \text{ cm}$$



2. Find the volume of a cylinder with surface area 48π in² and radius 3 in.

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

3 3/5

$$SA = \underline{2\pi r^2} + \underline{2\pi r h}$$



$$2\pi (3)^2 + 2\pi \cdot 3 \cdot h = 48\pi$$

$$\cancel{18\pi} + \cancel{6\pi h} = \cancel{48\pi}$$

$$\cancel{24\pi h} = \cancel{48\pi}$$

$$18 + 6h = 48$$

$$\underline{-18}$$

$$6h = \frac{30}{6} \rightarrow h = 5$$

$$\pi(3)^2 \cdot 5$$

$$45\pi \text{ in}^3$$

Circle circumference ✓

Circle area ✓

Cylinder volume ✓

Cylinder surface area ✓

Cone volume ✓

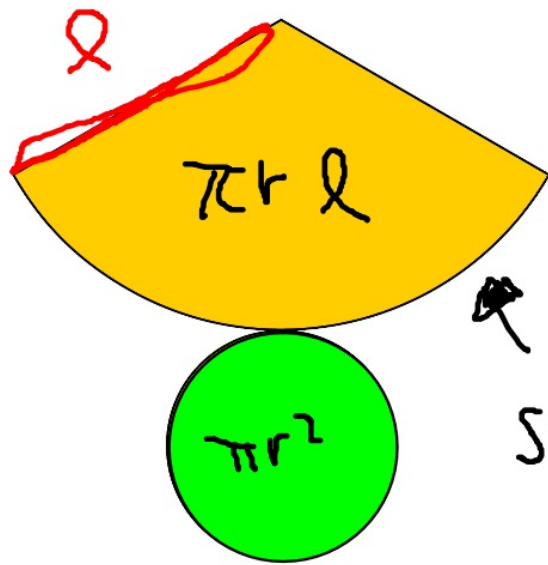
Cone surface area

Sphere volume

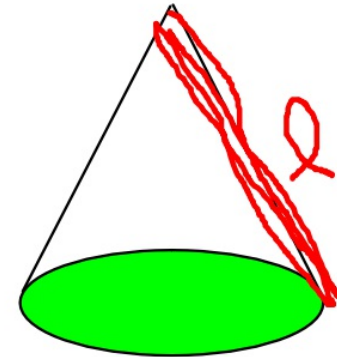
Sphere surface area

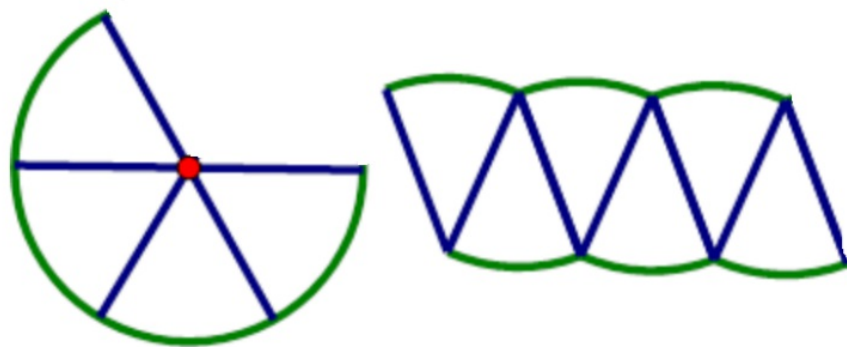
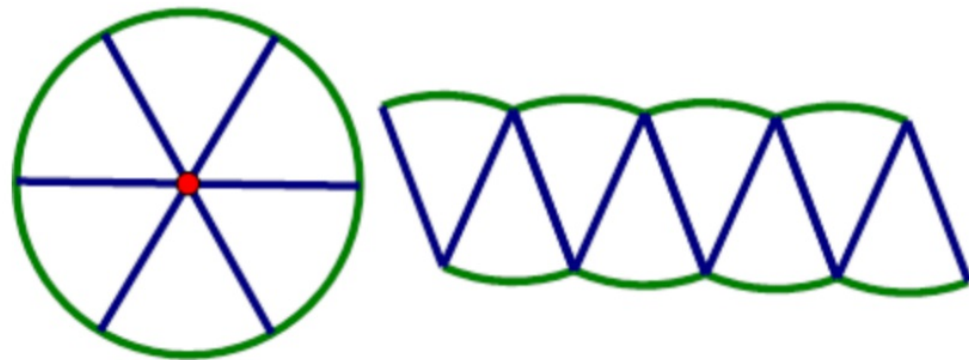
Density

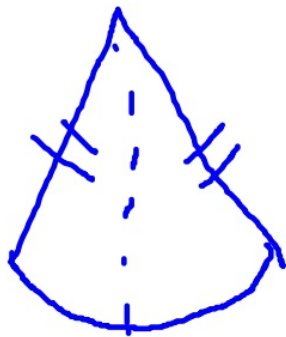
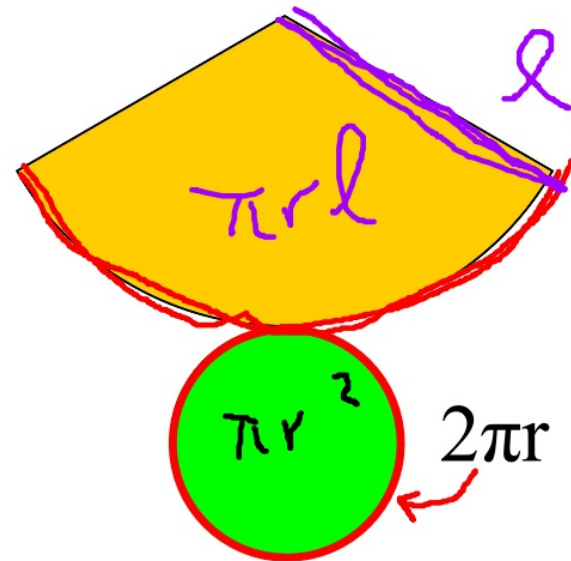
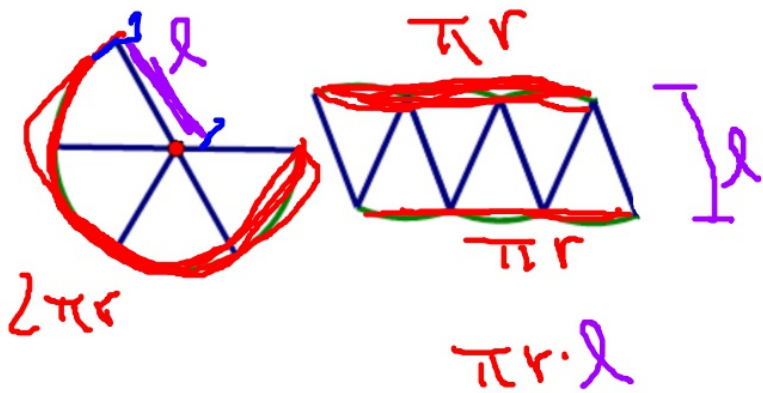




$$SA = \pi r^2 + \pi r l$$







Practice with Volume

(this problem is on back of
'coordinate review' handout)

An ice box has dimensions $12 \times 24 \times 16$ inches. It is full of shaved ice for snow cones. Each paper cone cup has a radius of 1.5 inches and a height of 5 inches. Assuming the ice does not melt and that each cup is filled completely, about how many cups can be filled?

Interpret and compare
trade papers, read over their work, explain back to them
what you think they did

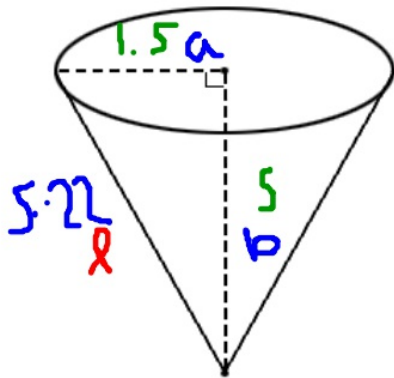
$$V = \frac{1}{3} \pi r^2 \cdot h = \frac{1}{3} \pi (1.5)^2 \cdot 5$$
$$= 11.78 \text{ in}^3$$



$$391.17$$

Follow up!

Find the cost of the cups needed if the paper company charges \$0.95 per square foot of paper. Hint: $1 \text{ ft}^2 = 144 \text{ in}^2$



$$SA = \pi r^2 + \pi r l = 24.6 \text{ in}^2$$

$$\begin{array}{r} \times 391 \\ \hline 9618.1 \text{ in}^2 \\ \hline 144 \end{array}$$

$$\boxed{\$63.46} \times \$0.95 \leftarrow 66.79 \text{ ft}^2$$

Coin Carpet continued!

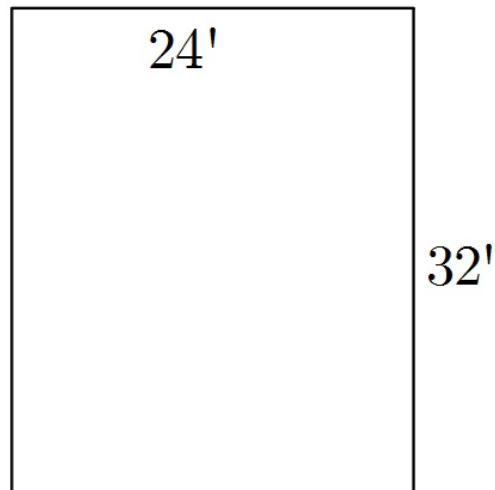
Cost for coin carpet?

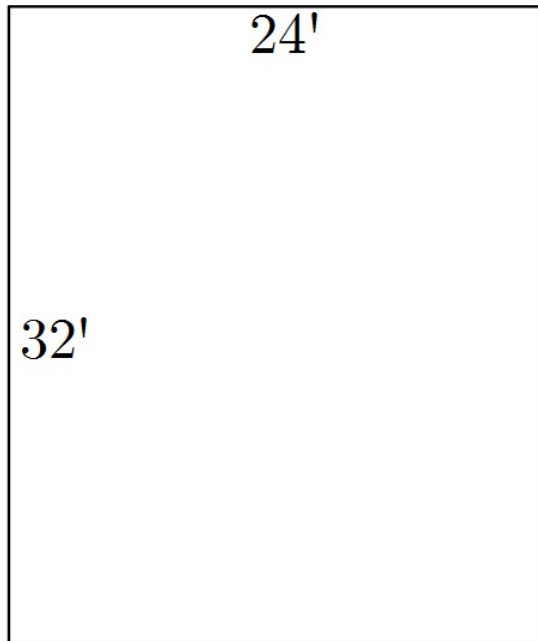


Penny diameter: 1.905 cm

Classroom dimensions: 32 feet by 24 feet

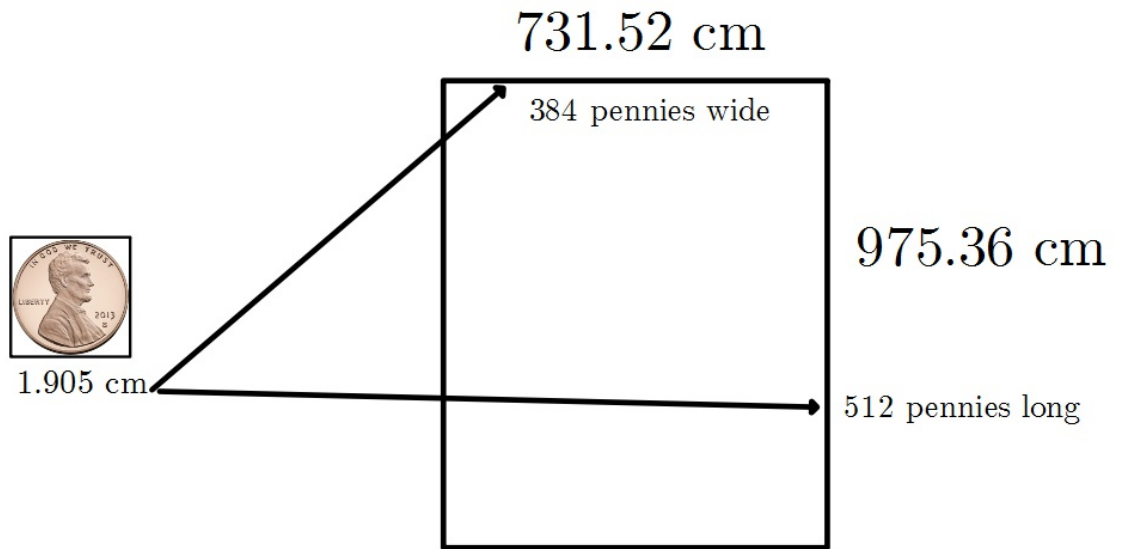
1 inch = 2.54 cm
1 foot = 12 inches





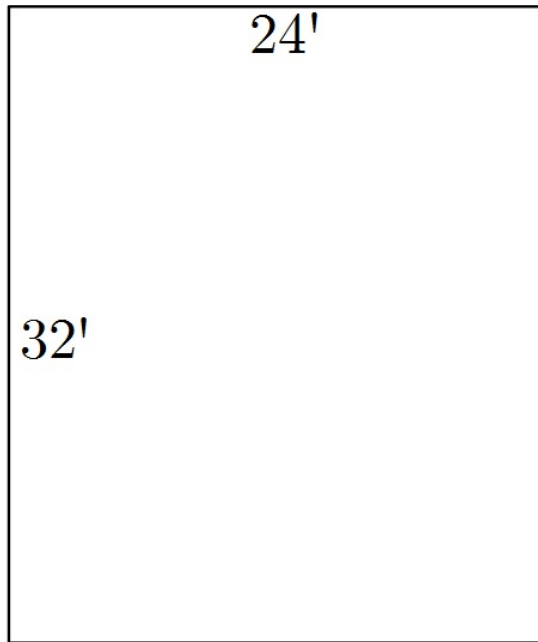
Convert room measurement to cm

24' x 32' → 288in x 384in → 731.52 cm x 975.36 cm



Pennies needed: $384 * 512 = 196608$

Dollars: \$1966.08



Convert room measurement to cm

$$24' \times 32' \longrightarrow 288\text{in} \times 384\text{in} \longrightarrow 731.52 \text{ cm} \times 975.36 \text{ cm}$$

$$\begin{array}{l} \text{Area of room in cm}^2 \\ 713,495.347 \text{ cm}^2 \end{array}$$

effective area
 3.629 cm^2

$$\frac{713,495.347 \text{ cm}^2}{3.629 \text{ cm}^2}$$

196609.354 pennies

\$1966.09

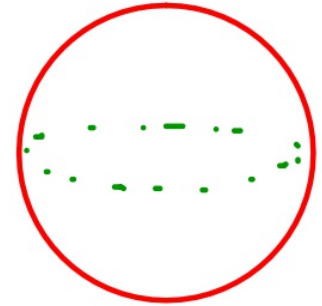
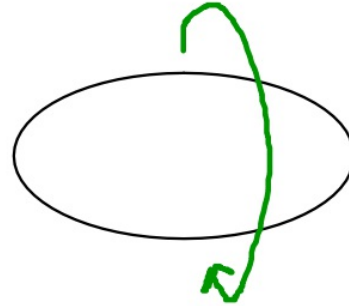
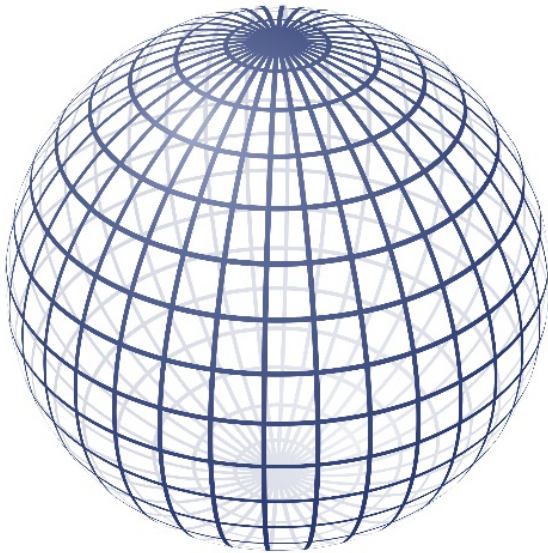


1.905cm

Convert mm to cm

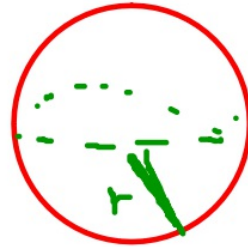
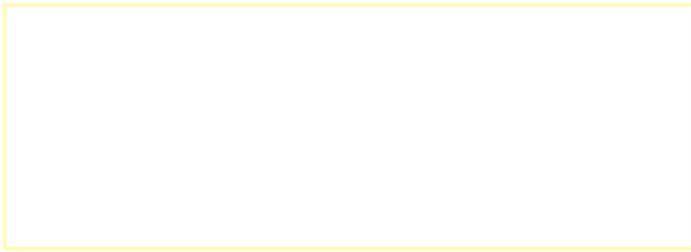
$$19.05 \text{ mm} \longrightarrow 1.905 \text{ cm}$$

Spheres!



Sphere Volume

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



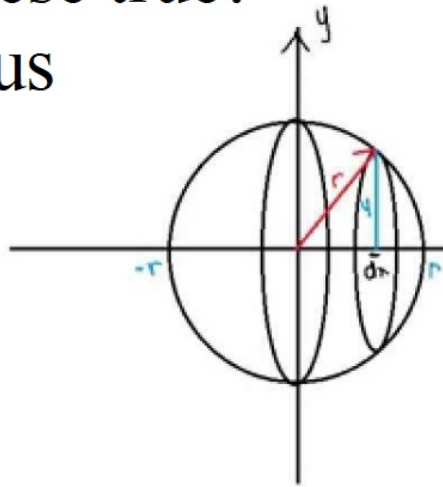
Sphere Surface Area

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



Why are these true?

Uh...calculus



$$A = \pi y^2$$
$$\int_0^y dV = \int_{-r}^r \pi y^2 dx$$

$$y^2 + x^2 = r^2$$
$$y^2 = r^2 - x^2$$

$$V = \pi \int_{-r}^r (r^2 - x^2) dx$$

$$= \pi \left[r^2 x - \frac{x^3}{3} \right]_{-r}^r$$

$$= \pi \left[\left(r^2(r) - \frac{r^3}{3} \right) - \left(r^2(-r) - \frac{(-r)^3}{3} \right) \right]$$

$$= \pi \left[r^3 - \frac{r^3}{3} \right] - \dots$$

Find the exact volume of a basketball with a 12 inch diameter.

$$V = \frac{4}{3} \pi (6)^3$$

$$\frac{4}{3} \cdot \pi \cdot 216$$


$$288 \pi \text{ in}^3$$

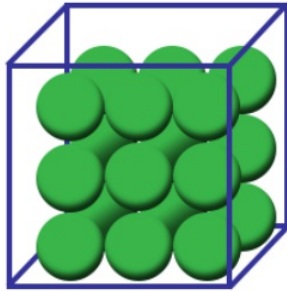
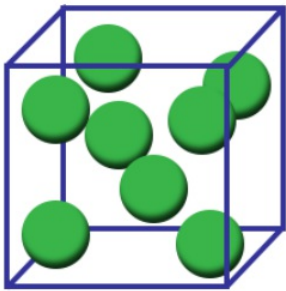
Density

What do you already know about this word?

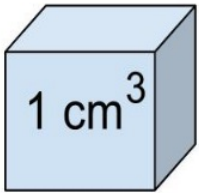
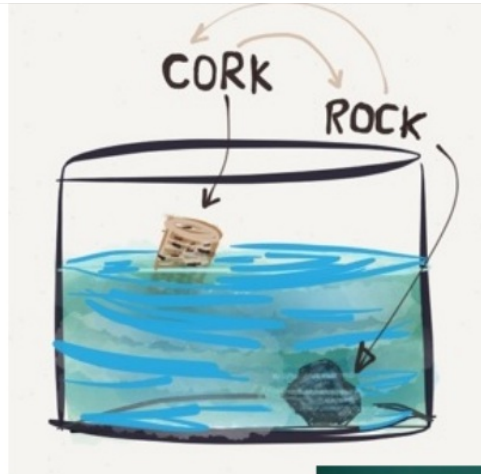
$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

or, amount of stuff in a fixed space

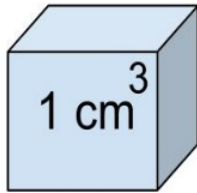
Density



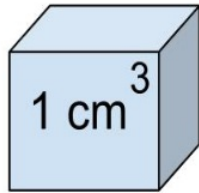
TheEngineeringMindset.com



Foam
0.03g



Diamond
3.5g



Iron
7.8g



A small bit of a heavy rock has broken off. The piece is in the shape of a cone and measures 3 cm long and is 3 cm wide at its base. Placed on a scale, the mass is determined to be 14.8 grams. What type of rock is it most likely, based on the table below?

<u>Type</u>	<u>Density (g/cm³)</u>
Shale	0.5
Granite	3.7
Sandstone	2.1
Diamond	4.8

$$D = \frac{m}{V}$$
$$\frac{14.8}{7.1} \approx 2.1$$

HW

p. 521-522: #2, 4, 8, 11, 12, 14

study formulas: bit.ly/formulas18

assessment: Thursday 3/29