

Modeling Geometry Quiz 5A Review

1. List the following area and volume formulas

a. Area

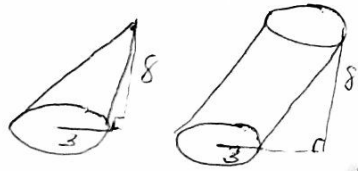
- i. Triangle- $\frac{1}{2}bh$
- ii. Square- s^2
- iii. Rectangle- lw
- iv. Trapezoid- $\frac{1}{2}(b_1+b_2)h$
- v. Kite- $\frac{1}{2}d_1d_2$
- vi. Equilateral Triangle- $\frac{\sqrt{3}}{4}s^2$
- vii. Circle- πr^2

b. Volume

- i. Pyramid- $\frac{1}{3}BH$
- ii. Prism- BH
- iii. Cylinder- πr^2H
- iv. Sphere- $\frac{4}{3}\pi r^3$
- v. Cone $\frac{1}{3}\pi r^2H$

2. Draw and label an Oblique Cone and Cylinder. Find the volume of your shape.

tilted
(but same formula)



\checkmark cone = $\frac{1}{3}\pi(3)^2(8) = 24\pi \text{ in}^3$

\checkmark cylinder = $\pi(3)^2(8) = 72\pi \text{ in}^3$

* dimensions and volumes may vary.

3. What does the Cross Section look like of any object, cut parallel to the base? What about perpendicular to the base?

parallel - base shape

perpendicular - either a rectangle, \triangle or circle
 prism \swarrow pyramid \nearrow
 sphere \downarrow

4. Find the volume of a rectangular prism with a height of $(a-2)$, length of $(a+7)$, and a width of $(a+1)$.

$V = (a-2)(a+7)(a+1)$

$V = (a^2 + 5a - 14)(a+1)$

a	a^3	$5a^2$	$-14a$
+1	a^2	$5a$	-14

$V = a^3 + 6a^2 - 9a - 14$

5. Find the volume of the cylinder with a radius of 5.

$$10^2 + H^2 = 20^2$$

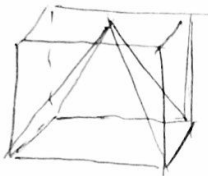
$$\sqrt{H^2} = \sqrt{20^2 - 10^2}$$

$$H = \sqrt{300}$$

$$H = 10\sqrt{3} \text{ cm} \quad V = \pi(5)^2(10\sqrt{3}) = 250\pi\sqrt{3} \text{ cm}^3$$



6. A ^{square} triangular pyramid fits snugly in a cube with side length of 5. Find the volume of empty space in the box. Draw a picture.

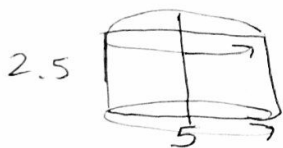


$$A = \frac{1}{3}(5)^2(5) = \frac{125}{3}$$

$$V = 125$$

$$125 - \frac{125}{3} \approx 83.3 \text{ in}^3$$

7. A rectangle with side length of 5 and width of 2.5 is rotated to create a cylinder. What is the volume of cylinder made?



$$V = \pi(2.5)^2(2.5)$$

$$V = 15.625\pi \text{ in}^3$$

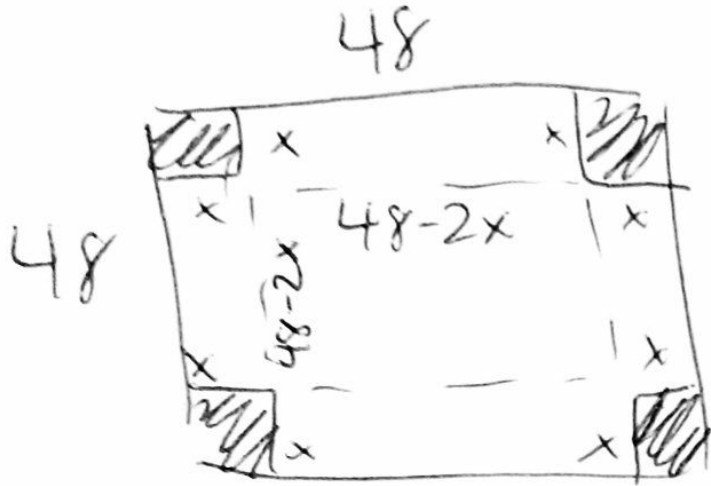
8. A circular table with radius of 10 in has 67 crumbs on it. What is the population density of the crumbs on the table?

$$P.D. = \frac{\text{pop}}{\text{area}} = \frac{67 \text{ crumbs}}{\pi(10)^2 \text{ in}^2} \approx 0.21 \text{ crumbs/in}^2$$

9. You have a concrete cube with mass of 70 kg. The density of concrete is 2400 kg/ cubic meter. What is the volume of the cube?

$$D = \frac{m}{V} \rightarrow V = \frac{m}{D} = \frac{70 \text{ kg}}{2400 \text{ kg/m}^3} \approx 0.03 \text{ m}^3$$

10. A piece of cardboard measures 48 inches on each side. Congruent squares on all 4 corners will be cut out to fold into a box. Find the approximate **box** (to the nearest inch) in which the volume is maximized.



$$V = x(48 - 2x)^2$$

where x is $[0, 24]$

$$x \approx 8 \text{ in}$$

The box is 8 in. x 32 in. x 32 in.