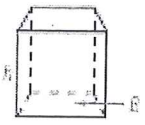
Geometry Notes
13.1 & 3

Name: Key
Date: _____ Hour: _____

GOALS:
1. Find volumes of prisms.
2. Find volumes of cylinders.
3. Find volume of spheres.

**Theorem 11-6 Volume of a Prism**

The volume of a prism is the product of the area of the base and the height of the prism.

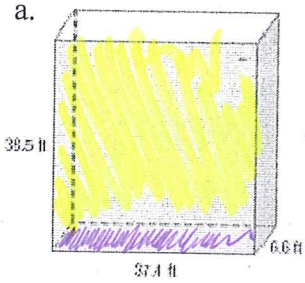


V = B · h

B = area of Base

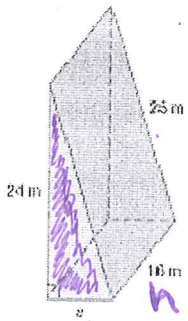
1. Find the volume of the prisms below

a.




$B = l \cdot w$
$= 37.4\,ft \cdot 6.6\,ft$
$B = 246.84\,ft^2$
$V = B \cdot h$
$V = 246.84\,ft^2 \cdot 38.5\,ft$
$V = 9503.34\,ft^3$

b.

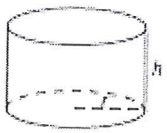



$a^2 + b^2 = c^2$
$a^2 + 24^2 = 25^2$
$a^2 + 576 = 625$
$-576 \quad -576$
$\sqrt{a^2} = \sqrt{49}$
$a = 7$

$B = \frac{1}{2} \cdot 7 \cdot 24$
$B = 84\,m^2$
$V = B \cdot h$
$V = 84\,m^2 \cdot 16\,m$
$V = 1,344\,m^3$

**Theorem 11-7 Volume of a Cylinder**

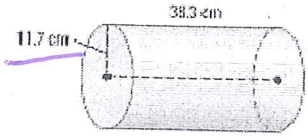
The volume of a cylinder is the product of the area of the base and the height of the cylinder.




V = B · h or V = $\pi r^2 \cdot h$

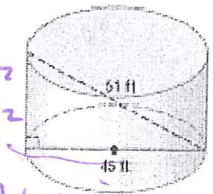
Find the volume of each cylinder

a.




$\pi \cdot 11.7^2 \cdot 38.3$
$= 16,471.0\,cm^3$

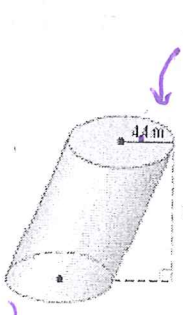
b.




$a^2 + b^2 = c^2$
$45^2 + b^2 = 51^2$
$2,025 + b^2 = 2,601$
$-2,025 \quad -2,025$
$\sqrt{b^2} = \sqrt{576}$
$b = 24$
$h = 24$

$V = \pi r^2 \cdot h$
$V = \pi \cdot 22.5^2 \cdot 24$
$V \approx 38,170.4\,ft^3$

c.

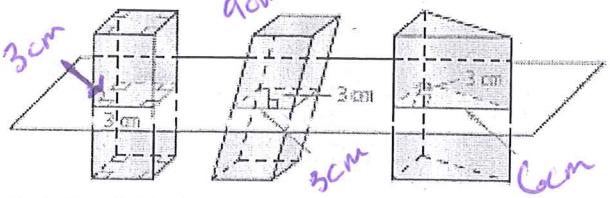



$V = \pi r^2 \cdot h$
$\approx 802.8\,m^3$

## Theorem 11-5 Cavalieri's Principle

If two space figures have the same height and the same cross-sectional area at every level, then they have the same volume.

9. The three prisms below have the same height and the same volume. The first is a square prism. Label the missing dimensions.




$\frac{1}{2} \cdot b \cdot 3 = 9\text{cm}$

$\frac{3b}{3} = \frac{18}{3}$

$b = 6$

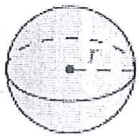
10. Circle the solid(s) that may have the same cross-sectional area at every level.

cone cylinder prism pyramid

## Theorem 11-11 Volume of a Sphere

If a sphere has a volume of V cubic units and a radius of r units, then

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

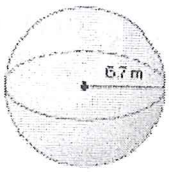



Draw a line from each measure in Column A to its corresponding formula in Column B.

| Column A | Column B |
|---|---|
| 16. surface area of a sphere | $\frac{4}{3}\pi r^3$ |
| 17. volume of a sphere | $4\pi r^2$ |

Find the volume of each sphere.

a.

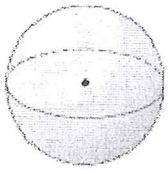



$V = \frac{4}{3} \cdot \pi \cdot 6.7^3$

$= \frac{4}{3} \cdot \pi \cdot 6.7 \cdot 6.7 \cdot 6.7$

$\approx 1259.8\ m^3$

b. C = 100 ft



$C = 2\pi r$

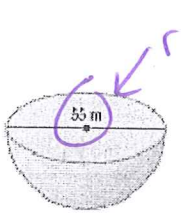
$\frac{100}{2\pi} = \frac{2\pi r}{2\pi}$

$r = \frac{50}{\pi}$

$V = \frac{4}{3}\pi \left(\frac{50}{\pi}\right)^3$

$\approx 16,886.9\ ft^3$

c.




$V = \frac{1}{2} \cdot \frac{4}{3} \cdot \pi r^3$

$= \frac{2}{3}\pi (27.5)^3$

$\approx 43,556.9\ m^3$