Power Point Handout : Volume

11/24/2014

3-D Shapes and Volumes

General Formula for Volume:

$V = Bh$ B= area of base

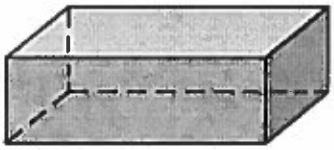
Volume for "pointy" objects:

$V = \frac{1}{3}Bh$ B= area of base

3-D Shapes and Volumes

Name: rectangular prism

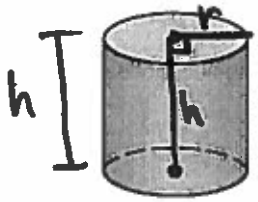
Formula for Volume: $V = Bh$ or $V = lwh$



3-D Shapes and Volumes

Name: cylinder

Formula for Volume: $V = Bh$ or $V = \pi r^2 h$



if given diameter, divide by 2 to get radius

height is perpendicular to base (right angle with radius)

3-D Shapes and Volumes

Name: cone

Formula for Volume: $V = \frac{1}{3}Bh$ or $V = \frac{1}{3}\pi r^2 h$ or $V = \frac{\pi r^2 h}{3}$

(volume of cylinder ÷ 3)

- if given diameter, divide by 2 to get radius
- height is perpendicular to the base

3-D Shapes and Volumes

Name: sphere

Formula for Volume: $V = \frac{4}{3}\pi r^3$

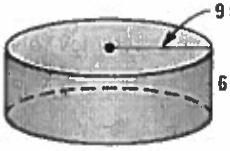
divide diameter by 2 to get radius

- cube the radius (3rd power)
- multiply by π & 4
- divide by 3

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

3-D Shapes & Volumes: Example

b. Right cylinder



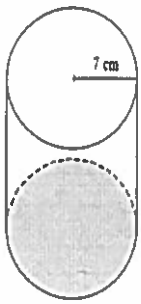
$V = \pi r^2 h$

$= (3.14)(9)^2(6)$

$= (3.14)(81)(6)$

$\approx 1526.04\ ft^3$

Cubic units



$V = \pi r^2 h$

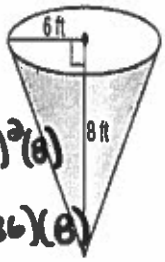
$= (3.14)(7)^2(11)$

$= (3.14)(49)(11)$

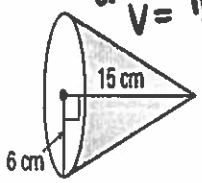
$= 1692.46\ cm^3$

3-D Shapes & Volumes: Examples

$V = \frac{1}{3}Bh$ $V = \frac{1}{3}\pi r^2 h$ or $V = \frac{\pi r^2 h}{3}$



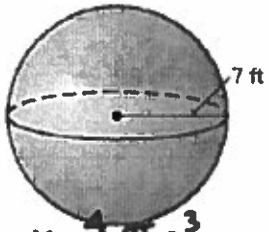
$V = \frac{1}{3}\pi r^2 h$
$= \frac{1}{3}(3.14)(6)^2(8)$
$= \frac{1}{3}(3.14)(36)(8)$
$= 301.44\ ft^3$



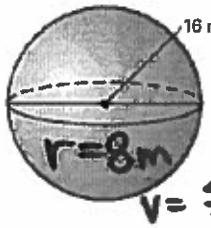
$V = \frac{1}{3}\pi r^2 h$
$= \frac{1}{3}(3.14)(6)^2(15)$
$= \frac{1}{3}(3.14)(36)(15)$
$= 565.2\ cm^2$

3-D Shapes & Volumes: Examples

Find the volumes of the following solids. Round to the nearest hundredth, if necessary.



$V = \frac{4}{3}\pi r^3$
$= \frac{4}{3}(3.14)(7)^3$
$= \frac{4}{3}(3.14)(343)$
$= 1436.03\ ft^3$



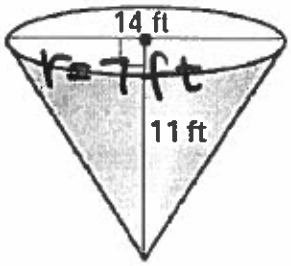
if $d = 16$, $r = 8$

$V = \frac{4}{3}\pi r^3$
$= \frac{4}{3}(3.14)(8)^3$
$= \frac{4}{3}(3.14)(512)$
$= 2143.57\ m^3$

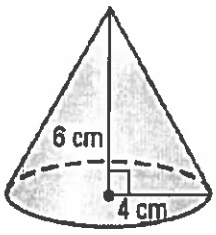
3-D Shapes & Volumes: Examples

Find the volumes of the following solids. Round to the nearest hundredth, if necessary.

$d = 14$, so $r = 7$



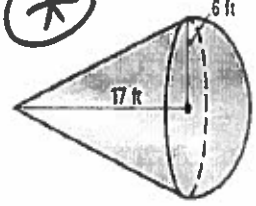
$V = \frac{1}{3}\pi r^2 h$
$= \frac{1}{3}(3.14)(7)^2(11)$
$= \frac{1}{3}(3.14)(49)(11)$
$= 564.15\ ft^3$



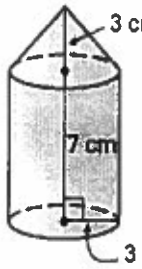
$V = \frac{1}{3}\pi r^2 h$
$= \frac{1}{3}(3.14)(4)^2(6)$
$= \frac{1}{3}(3.14)(16)(6)$
$= 100.48\ cm^3$

3-D Shapes & Volumes: Combined Figure Examples

(*)



see below



total
Cylinder: 214.2
Cone: 28.6
242.46 cm²

Cone + cylinder

Cylin: $\pi r^2 h$
$= 3.14(3)^2(7)$
$= 3.14(9)(7)$
cyl $= 214.2\ cm^2$

Cone $= \frac{1}{3}\pi r^2 h$
$= \frac{1}{3}(3.14)(3)^2(3)$
$= \frac{1}{3}(3.14)(9)(3)$
cone $= 28.6\ cm^2$

(*) Cone + half of a sphere

cone: $V = \frac{1}{3}\pi r^2 h$
$= \frac{1}{3}(3.14)(6)^2(17)$
$= \frac{1}{3}(3.14)(36)(17)$
$= 640.56\ ft^3$

sphere: $V = \frac{4}{3}\pi r^3$
$= \frac{4}{3}(3.14)(6)^3$
$= \frac{4}{3}(3.14)(216)$
$= 904.32\ ft^3$

half of sphere $= 452.16\ ft^3$

total volume
cone: 640.56
$\frac{1}{2}$ sphere: 452.16
1092.72 ft^3