Unit 7 Notes
3D Geometry – Volume of Cylinders, Cones, and Spheres

Tentative Schedule
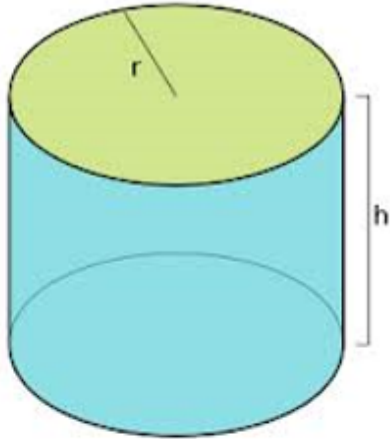
Day	Classwork	Assignment
Thurs. 2/26	**Test #6**	Video #7.1: 3D Geometry Day 1 with Notes 7.1
Fri. 2/27 Mon. 3/2	P.S. #7.1	Video #7.2: 3D Geometry Day 2 with Notes 7.2
Tues. 3/3	P.S. #7.2	Finish P.S. #7.2 and Optional Review Sheet
Wed. 3/4 Thurs. 3/5	**Quiz #7**	TBD

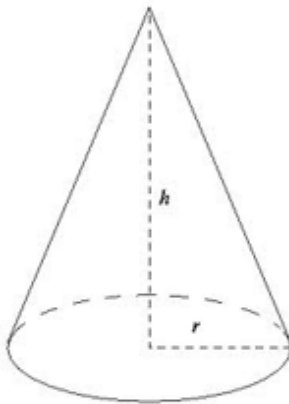Name: _____
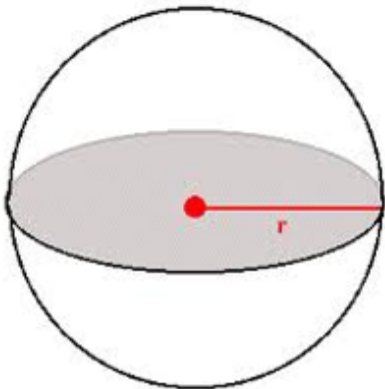
Notes 7.1 – 3D Geometry Day 1

Volume Formulas	
Cylinder	$V = \pi r^2 h$
Cone	$V = \frac{1}{3}\pi r^2 h$
Sphere	$V = \frac{4}{3}\pi r^3$

1.) Find the volume of a cylinder that has a height of 30 inches and a radius of 4 inches. Express your answer in two ways: as an exact answer and rounded to the nearest whole number.

$h=30$ $r=4$

$V = \pi r^2 h$

$V = \pi (4)^2 (30)$

$V = \pi (16)(30)$

$V = 480\pi \text{ in}^3 \approx 1507.96447372\ldots$

Exact Answer: $480\pi \text{ in}^3$ Nearest Whole Number: 1508 in^3

2.) Find the volume a cone that has a height of 30 inches and a radius of 4 inches. Express your answer as an exact answer.

$h = 30$ $r = 4$

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

$V = \frac{1}{3}\pi (4)^2 (30)$

$V = \frac{1}{3}\pi (16)(30)$

$V = \frac{1}{3}\pi (480)$

exact: $\boxed{V = 160\pi \text{ in}^3}$

3.) Find the volume of a sphere that has a radius of 3 inches. Round to the nearest thousandth.

$r = 3$

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

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

$V = \frac{4}{3}\pi (27) \longrightarrow \frac{\overset{9}{27} \cdot 4}{1 \cdot \cancel{3}_1} = 36$

$V = 36\pi \approx 113.0973355 29 \approx \boxed{113.100 \text{ in}^3}$

Notes 7.2 – 3D Geometry Day 2

1.) Find the volume of a perfect sphere that has a radius of $9 \cdot 10^5$ units.

$r = 9 \cdot 10^5$

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

$V = \frac{4}{3}\pi (9 \cdot 10^5)^3 \longrightarrow (9 \cdot 10^5)^3 = 9^3 \cdot (10^5)^3$

$= 729 \cdot 10^{15}$

$\begin{array}{r} 81 \\ 9 \\ \hline 729 \end{array}$

$V = \frac{4}{3}\pi (729 \cdot 10^{15})$

$V = 972\pi \cdot 10^{15} \approx 3054 \cdot 10^{15} = 3.054 \cdot 10^3 \cdot 10^{15} = \boxed{3.054 \cdot 10^{18} \ un^3}$

2.) Find the volume of a cylinder that has a radius of $4.7 \cdot 10^5$ and a height of $3.6 \cdot 10^4$.

$r = 4.7 \cdot 10^5$ $h = 3.6 \cdot 10^4$

$V = \pi r^2 h$

$V = \pi (4.7 \cdot 10^5)^2 \cdot (3.6 \cdot 10^4)$

$V = \pi (22.09 \cdot 10^{10})(3.6 \cdot 10^4)$

$V \approx 249.8 \cdot 10^{14} = 2.498 \cdot 10^2 \cdot 10^{14} = \boxed{2.498 \cdot 10^{16} \ un^3}$

3.) Find the combined volume of two spheres: one that has a radius of $3.1 \cdot 10^4$ units and
another that has a radius of $6.7 \cdot 10^3$.

Sphere 1

Sphere 2

Sphere 1:

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

$V = \frac{4}{3}\pi (3.1 \cdot 10^4)^3$

$V = \frac{4}{3}\pi (29.791 \cdot 10^{12})$

$V = 124.788 \cdot 10^{12}$

$V = 1.25 \cdot 10^2 \cdot 10^{12}$

$V = 1.25 \cdot 10^{14} \ un^3$

Sphere 2:

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

$V = \frac{4}{3}\pi (6.7 \cdot 10^3)^3$

$V = \frac{4}{3}\pi (300.763 \cdot 10^9)$

$V = 1259.83 \cdot 10^9$

$V = 1.26 \cdot 10^3 \cdot 10^9$

$V = 1.26 \cdot 10^{12}$

Combined volume:

$1.25 \cdot 10^{14} + 1.26 \cdot 10^{12}$

$1.25 \cdot 10^{14} + .0126 \cdot 10^{14}$

$\begin{array}{r} 1.2500 \\ + 0.0126 \\ \hline 1.2626 \end{array}$

$\boxed{1.2626 \cdot 10^{14} \ un^3}$

FINAL ANSWER