8th Grade Math
Mr. Willimann
'17 Test Review #1

Name: Key

Date: _____ Class: _____

Formulas

Cylinders

$C = \pi d$ OR $C = 2\pi r$

$L.A. = C \cdot h$

$A = \pi r^2$ OR $A = \pi \cdot r \cdot r$

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

Pyramids

$L.A. = \frac{1}{2}Pl$ $S.A. = L.A. + B$

$l = slant\ height$ $P = Perimeter\ of\ base$

$V = \frac{1}{3}Bh$

Cones

$L.A. = \pi rl$ $S.A. = L.A. + \pi r^2$

$A = \pi r^2$ OR $A = \pi \cdot r \cdot r$

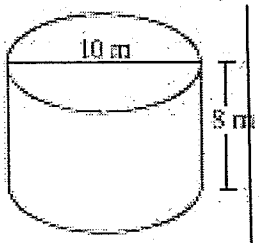
$V = \frac{1}{3}\pi r^2 \cdot h$

Spheres

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

Find the volume and surface area of each of the shapes below. Show your work.

1.



Surface Area: $408.2 m^2$

$C = 3.14(10) = 31.4 m$

$L.A. = 8(31.4) = 251.2 m^2$

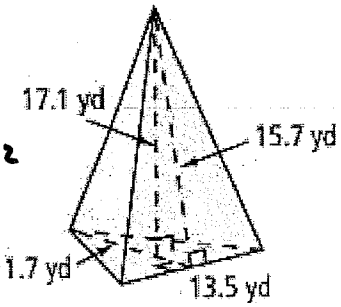
$A\ of\ O = 3.14(5^2) = 78.5 m^2$

$SA = 251.2 + 78.5 + 78.5 = 408.2 m^2$

Volume: $628 m^3$

$V = 3.14(5^2)(8)$

2. Regular Triangular Pyramid



Surface Area: $396.88 yd^2$

$P = 40.5 yd$

$L.A. = \frac{1}{2}(40.5)(15.7)$

$L.A. = 317.9 yd^2$

$B = \frac{1}{2}(13.5)(11.7) = 78.98 yd^2$

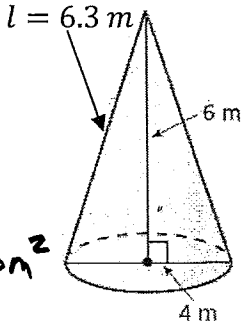
$SA = 317.9 + 78.98 = 396.88 yd^2$

Volume: $450.2 yd^3$

$B = \frac{1}{2}(13.5)(11.7) = 78.98 yd^2$

$V = \frac{1}{3}(78.98)(17.1)$

3. $SA = 39.6 + 12.6$



Surface Area: $52.2 m^2$

Volume: $25.1 m^3$

$L.A. = 3.14(2)(6.3) = 39.6 m^2$

~~$A\ of\ O = 3.14(\quad^2)(6) =$~~

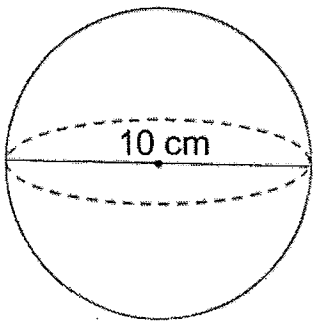
$A\ of\ O = 3.14(2^2) = 12.6 m^2$

$V = \frac{1}{3}(3.14)(2^2)(6)$

4. Just find volume.

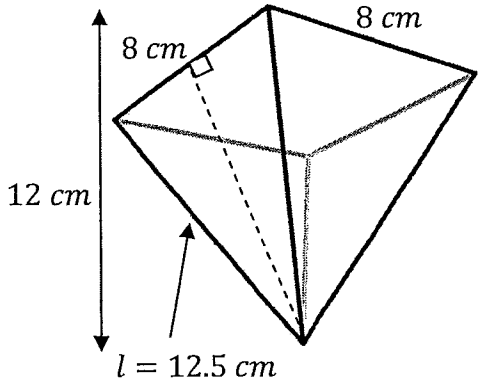
Volume: $523.\overline{3}\ cm^3$

$V = \frac{4}{3}(3.14)(5^3)$



5) A candy store sells candy in the following containers. Find the volume of each container. Then determine which container is the better buy. Round to the nearest tenth when necessary. Explain your reasoning.

Square Pyramid Container = $2.00



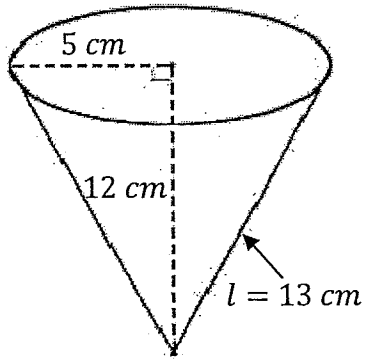
$B = 8(8) = 64 cm^2$

$V = \frac{1}{3}(64)(12) = 256 cm^3$

$\frac{256 cm^3}{\$2} = \frac{128 cm^3}{\$1}$

V = 256 cm^3

Cone Container = $2.50



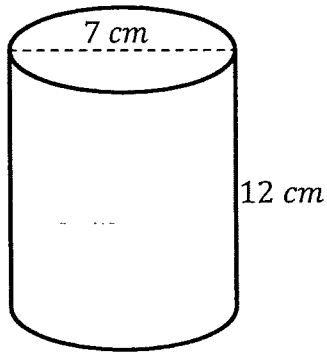
$V = \frac{1}{3}(5^2)(12)(3.14)$

$V = 314 cm^3$

$\frac{314 cm^3}{\$2.50} = \frac{125.6 cm^3}{\$1}$

V = 314 cm^3

Cylinder Container = $3.25



$V = 3.14(3.5^2)(12)$

$V = 461.58 cm^3$

$\frac{461.58 cm^3}{\$3.25} = \frac{142 cm^3}{\$1}$

V = 461.58 cm^3

Best Deal → Cylinder Container

B) Determine which container requires the least amount of material to make. None of the containers have a top. SHOW WORK. Pyramid requires the least amount.

$P = 8(4) = 32 cm$

$L.A. = \frac{1}{2}(32)(12.5) = 200 cm^2$

Pyramid Material = 200 cm^2

$L.A. = 3.14(5)(13) = 204.1 cm^2$

Cone Material = 204.1 cm^2

$C = 3.14(7) = 21.98 cm$

$L.A. = 21.98(12) = 263.76 cm^2$

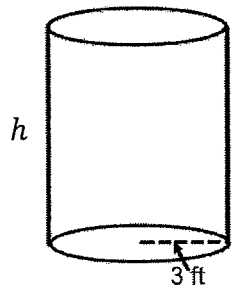
$A\ of\ O = 3.14(3.5^2) = 38.5 cm^2$

$S.A. = 263.76 + 38.5$

$= 302.26 cm^2$

Cylinder Material = 302.26 cm^2

6) The cylinder below has a volume of 282.6 cubic feet. Find the surface area of the cylinder. SHOW WORK.



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

$282.6 = 3.14(3^2) \cdot h$

$\frac{282.6}{28.26} = \frac{28.26h}{28.26}$

$10 ft = h$

$C = 3.14(3)(2) = 18.84 ft$

$L.A. = 18.84(10) = 188.4 ft^2$

$A\ of\ O = 3.14(3^2) = 28.26 ft^2$

$SA = 188.4 + 28.26 + 28.26 = 244.92 ft^2$

Surface Area = 244.92 ft^2

7) Find the missing dimensions of the figures below. SHOW WORK AND LABEL.

A) A cone with a volume of 1004.8 cubic centimeters and a diameter of 16 centimeters. Determine the height of the cone. $V = \frac{1}{3} \cdot \pi r^2 \cdot h$ $1004.8 = \frac{1}{3}(3.14)(8^2) \cdot h$

$r = 8\text{cm}$ $\frac{1004.8}{66.98\overline{6}} = \frac{66.98\overline{6} \cdot h}{66.98\overline{6}}$

$15\text{cm} = h$

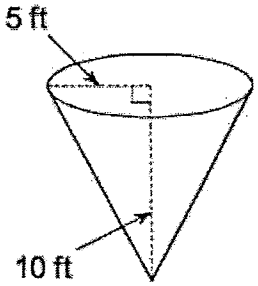
B) A cylinder with a volume of 6838.92 cubic meters and a height of 18 meters. Determine the radius of the cylinder. $V = 3.14(r^2) \cdot h$ $6838.92 = 3.14(r^2) \cdot 18$

$\frac{6838.92}{56.52} = \frac{56.52r^2}{56.52}$

$\sqrt{121} = \sqrt{r^2}$

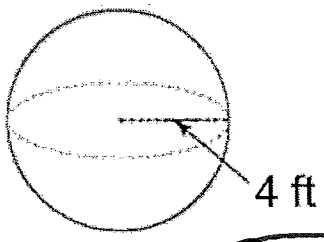
$11\text{m} = r$

8) List the figures in order from smallest to largest volumes. SHOW WORK.

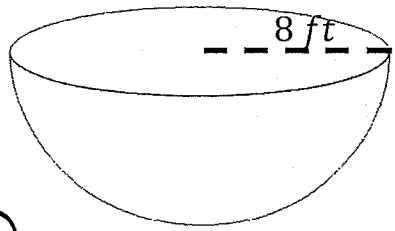


$V = \frac{1}{3}(3.14)(5^2)(10)$

$V = 261.\overline{6}\,\text{ft}^3$



$V = \frac{4}{3}(3.14)(4^3) = 267.94\overline{6}\,\text{ft}^3$



$V = \frac{4}{3}(3.14)(8^3) = 2143.6\,\text{ft}^3$

$2143.6(1/2) = 1071.8\,\text{ft}^3$

List from smallest to greatest → Cone, Sphere, Hemisphere

9) A cylinder has the volume of 226.1 cubic inches and a surface area of 207.2 square inches. Find the volume and surface area of the similar cylinders with the scaled factors listed below. SHOW WORK.

A) Scale Factor of 3.

$V = 226.1(3^3) = 6104.7\,\text{in}^3$

$S.A. = 207.2(3^2) = 1864.8\,\text{in}^2$

B) Scale Factor of $\frac{1}{4}$.

$V = 226.1(1/4)^3 = 3.5\,\text{in}^3$

$S.A. = 207.2(1/4)^2 = 12.95\,\text{in}^2$

10) Pyramid A is similar to Pyramid B. Pyramid B has a volume of 1024 cubic feet. By what scale factor can you multiply every side of Pyramid A to get Pyramid B if the volume of Pyramid A is 16 cubic feet? SHOW WORK

$\frac{B}{A} \rightarrow \frac{1024\,ft^3}{16\,ft^3} = 64$ times larger or

$\sqrt[3]{64} = 4$

scale factor = 4

11) Cone A is similar to Cone B. Cone B has a surface area of 80 square centimeters. By what scale factor can you multiply every side of Cone A to get Cone B if the surface area of 20 square centimeters? SHOW WORK

$\frac{B}{A} \rightarrow \frac{80\,cm^2}{20\,cm^2} = 4$ times larger

$\sqrt{4} = 2$

scale factor = 2