Name KEY Date _____ Period _____

Spheres Surface Area and Volume Worksheet

1) A sphere has a radius of 8 cm. Find its volume and surface area.
Give your answers to 3 significant figures. Use $\pi = 3.142$

$S = 4\pi r^2 = 4\pi(8)^2 = 256\pi \approx 804.248 \text{ cm}^2$

$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi(8)^3 \approx 2144.661 \text{ cm}^3$

2) A hemispherical bowl has a radius of 15 cm. It is filled completely with water and covered with a lid.
(a) Find the volume of the water.
(b) Find the surface area of the bowl (including the lid).
Give your answers to 3 significant figures. Use $\pi = 3.142$

a) $V = \frac{1}{2} \cdot \frac{4}{3}\pi r^3 = \frac{2}{3}\pi(15)^3 \approx 7068.583 \text{ cm}^3$

b) $S = 3\pi r^2 = 3\pi(15)^2 \approx 2120.575 \text{ cm}^2$

3) A bowl has the form of a hollow hemisphere with a radius of 8.4 cm.
Find the external surface area and the volume of the bowl.
Give your answers to 3 significant figures. Use $\pi = 3.142$

$S = \frac{1}{2} \cdot 4\pi r^2 = 2\pi(8.4)^2 \approx 443.342 \text{ cm}^2$

$V = \frac{1}{2} \cdot \frac{4}{3}\pi r^3 = \frac{2}{3}\pi(8.4)^3 \approx 1241.356 \text{ cm}^3$

4) Find the surface area of a sphere whose volume is 288π cm^3.
Give your answer to 3 significant figures. Use $\pi = 3.142$

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

$288\pi = \frac{4}{3}\pi r^3$

$216 = r^3$

$r = 6$

$\rightarrow S = 4\pi r^2 = 4\pi(6)^2 \approx 452.389 \text{ cm}^2$

5) Find the volume of an open hemisphere whose external surface area is 1762 cm².
Give your answer to 3 significant figures. Use $\pi = 3.142$

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

$1762 = 2\pi r^2$

$280.431 \approx r^2$

$16.746 \approx r$

$V = \frac{1}{2} \cdot \frac{4}{3}\pi r^3 = \frac{2}{3}\pi(16.746)^3 \approx 9835.528 \text{ cm}^3$

6) The surface area of a closed hemisphere is given as 618 cm².
(a) Find the radius of the hemisphere.
(b) Find the volume of the hemisphere.
(c) Find the external surface area of the hemisphere if it were hollow.
Give your answers to 3 significant figures. Use $\pi = 3.142$

a) $S = 3\pi r^2$

$618 = 3\pi r^2$

$65.572 \approx r^2$

$8.098 \approx r$

b) $V = \frac{1}{2} \cdot \frac{4}{3}\pi r^3 = \frac{2}{3}\pi(8.098)^3 \approx 1112.076 \text{ cm}^3$

c) $S = \frac{1}{2} \cdot 4\pi r^2 = 2\pi(8.098)^2 \approx 412 \text{ cm}^2$

OR

$S = \frac{2}{3} \cdot 618 = 412$

7) A hemispherical bowl has a radius of 10 cm.
(a) Find the volume of the bowl.
(b) Find the external surface area of the bowl.
(c) A cylinder of radius 7 cm and height h cm has the same volume as the bowl. Calculate the value of h.
Give your answers to 3 significant figures. Use $\pi = 3.142$

a) $V = \frac{1}{2} \cdot \frac{4}{3}\pi r^3 = \frac{2}{3}\pi(10)^3 \approx 2094.395 \text{ cm}^3$

b) $S = \frac{1}{2} \cdot 4\pi r^2 = 2\pi(10)^2 \approx 628.319 \text{ cm}^2$

c) $V_{cyl} = \pi r^2 h$

$2094.395 = \pi(7)^2 h$

$h \approx 13.605 \text{ cm}$