

Volume ratio = SF^3
 Area ratio = SF^2

Name: _____
 Date: _____
 Class: _____

Geometry
 Unit 9
 HW 9-5

1) Two cylinders are similar with volumes equal to 512 and 5832 cubic inches. If the radius of the smaller cylinder is represented by $2x + 2$ and the radius of the larger cylinder is represented by $4x + 9$, find the difference between the radii.

$$\frac{2x+2}{4x+9} = \sqrt[3]{\frac{512}{5832}} = \frac{4}{9}$$

SF^3

$$\frac{4}{9} = \frac{2x+2}{4x+9}$$

$$4(4x+9) = 9(2x+2)$$

$$16x+36 = 18x+18$$

$$18 = 2x$$

$$x = 9$$

$$2(9)+2 = 20$$

$$4(9)+9 = 45$$

$$45 - 20 = 25$$

2) Two spheres have a ratio of their diameters which is 3:7. The volume of the larger sphere is represented by $84x + 518$ and the volume of the smaller sphere is represented by $9x - 81$. Find the volume of the smaller sphere to the nearest whole number.

$$\left(\frac{3}{7}\right)^3 = \frac{9x-81}{84x+518} = \frac{27}{343}$$

$$2268x + 13986 = 3087x - 27783$$

$$41769 = 819x$$

$$x = 51$$

$$9(51) - 81 = 378$$

3) Two pyramids with a pentagonal base are similar. Their volumes are 343 and 1331 cubic meters. If the area of the base of the smaller pyramid is represented by $9x - 24$ and the area of the base of the larger pyramid is represented by $22x - 55$, find the height of the larger pyramid to the nearest meter.

$$\frac{343}{1331} = \left(\frac{9x-24}{22x-55}\right)^3$$

$$\frac{7}{11} = \frac{9x-24}{22x-55}$$

$$1078x - 2695 = 1089x - 2904$$

$$209 = 11x$$

$$x = 19$$

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

$$1331 = \frac{1}{3}(22(19)-55)h$$

$$121 = (22(19)-55)h$$

$$121 = 371h$$

$$h = 11$$

4) Two rectangular prisms are similar with scale factor 10:17. If the area of the base of the larger prism is represented by $54x - 410$ and the area of the base of the smaller prism is represented by $14x - 6$, find the height of the smaller prism (the volume of the smaller prism is 1000 cubic inches).

$$\left(\frac{10}{17}\right)^2 = \frac{14x-6}{54x-410}$$

$$1354x = 39266$$

$$x = 29$$

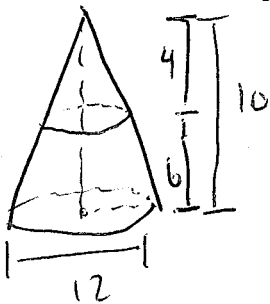
$$V = Bh$$

$$1000 = (14(29)-6)h$$

$$1000 = 406h$$

$$h = 2.5$$

5) A cone has a height of 10cm and a base diameter of 12cm. The top of the cone is cut off parallel to the base so that the height of the remaining portion is 6. What is the volume of the shape that is left?



$$\frac{4}{10} = \frac{2}{5}$$

SF

$$\left(\frac{2}{5}\right)^3 = \frac{8}{125}$$

SF³

$$\frac{8}{125} = \frac{x}{120\pi}$$

Small cone
 $x = 7.68\pi$

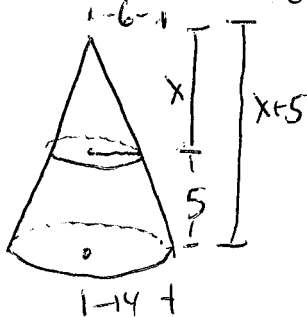
Truncated cone

$$120\pi - 7.68\pi$$

$$112.32\pi$$

cone $\rightarrow V = \frac{1}{3} \pi (6)^2 (10) = 120\pi$

6) The top of a cone has been removed (parallel to the base) so that the radius of the top is 6in and the radius of the bottom is 14in. If the height of the remaining shape is 5in, find the volume of the original cone to the nearest tenth.



$$\frac{6}{14} = \frac{3}{7}$$

SF

$$\frac{3}{7} = \frac{x}{x+5}$$

$$3x + 15 = 7x$$

$$15 = 4x$$

$$x = 3.75$$

height orig cone
 8.75

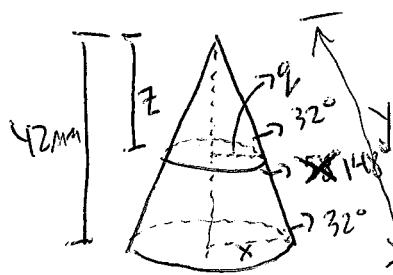
$$V = \frac{1}{3} \pi (14)^2 (8.75)$$

~~$$x = 4.75$$~~

~~$$V = 449.0 \text{ in}^3$$~~

$$V = 1795.94 \text{ in}^3$$

7) A cone is truncated (bases are parallel) so that the angle that the smaller base makes with the remaining portion of the slant height is 32°. The height of the original cone is 42mm. If the slant height is divided in such a way that the slant height of the original cone to the slant height of the top cone is 11:3, find the volume of the truncated cone to the nearest hundredth.



$$\tan 32 = \frac{42}{x}$$

$$x = 67.214$$

radius orig cone

~~$$\sin 32 = \frac{42}{x}$$~~

not necessary

~~$$y = 79.257$$~~

of orig cone

$$\frac{3}{11} = \frac{z}{42}$$

SF

height of top cone

$$z = 11.4545$$

$$V_{\text{orig}} = \frac{1}{3} \pi (67.214)^2 (42)$$

$$V_{\text{orig}} = 198699.7825$$

$$V_{\text{top}} = \frac{1}{3} \pi (18.3311)^2 (11.4545)$$

$$V_{\text{top}} = 4030.7124$$

$$\frac{3}{11} = \frac{9}{67.214}$$

$$9 = 18.3311$$

radius top cone

Truncated cone difference $\rightarrow 194669.070$