Honors Geometry

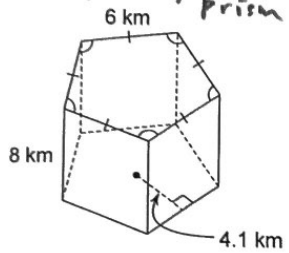
Name_____ ID: 1

Ch. 11 Study Guide (Surface Area & Volume)

Date_____ Period____

Find the lateral area and surface area of each figure. Round your answers to the nearest hundredth, if necessary.

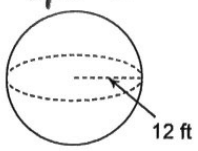
1) pentagonal prism



$LA = P_{base} \cdot height$
$= (5 \cdot 6) \cdot 8$
$= 240\ km^2$

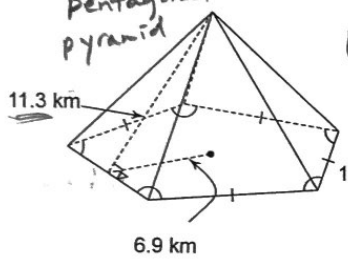
$SA = LA + 2B$
$= 240 + 2 \cdot \frac{1}{2}(4.1)(5 \cdot 6)$
$= 240 + 123$
$= 363\ km^2$

2) sphere



$SA = 4\pi r^2$
$= 4\pi (12)^2$
$= 576\pi\ ft^2$

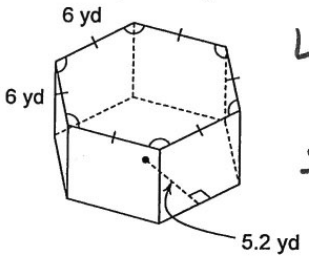
3) pentagonal pyramid



$LA = \frac{1}{2} \cdot P_{base} \cdot$ Sl. Height
$= \frac{1}{2} \cdot (5 \cdot 10)(11.3)$
$= 282.5\ km^2$

$SA = LA + B$
$= 282.5 + \frac{1}{2}(6.9)(5 \cdot 10)$
$= 282.5 + 172.5$
$= 455\ km^2$

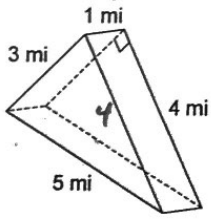
4) hexagonal prism



$LA = (6 \cdot 6) \cdot 6$
$= 216\ yd^2$

$SA = 216 + 2 \cdot \frac{1}{2}(5.2)(6 \cdot 6)$
$= 216 + 187.2$
$= 403.2\ yd^2$

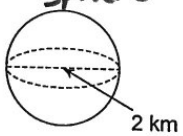
5) triangular prism



$LA = (3 + 4 + 5)(1)$
$= 12\ mi^2$

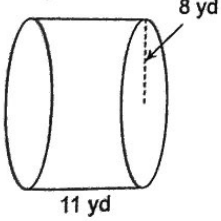
$SA = 12 + 2 \cdot \frac{1}{2}(3)(4)$
$= 12 + 12$
$= 24\ mi^2$

6) sphere



$SA = 4\pi (1)^2$
$= 4\pi\ km^2$

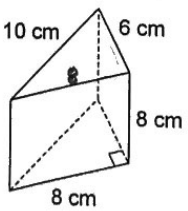
7) cylinder



$LA = P_{base} \cdot height$
$= 16\pi \cdot 11$
$= 176\pi\ yd^2$

$SA = LA + 2B$
$= 176\pi + 2\pi (8)^2$
$= 176\pi + 128\pi$
$= 304\pi\ yd^2$

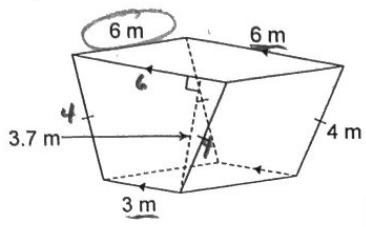
8) triangular prism



$LA = (6 + 8 + 10)(8)$
$= (24)(8)$
$= 192\ cm^2$

$SA = 192 + 2 \cdot \frac{1}{2} \cdot (6)(8)$
$= 192 + 48$
$= 240\ cm^2$

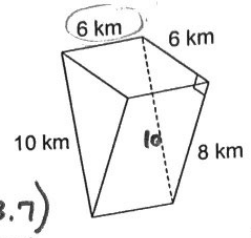
9) trapezoidal prism



$LA = (6+4+4+3)(6)$
$= (17)(6)$
$= 102\ m^2$

$SA = 102 + 2 \cdot \frac{1}{2}(6+3)(3.7)$
$= 102 + (9)(3.7)$
$= 102 + 33.3$
$= 135.3\ m^2$

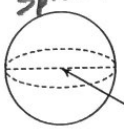
10) triangular prism



$LA = (6+8+10)(6)$
$= (24)(6)$
$= 144\ km^2$

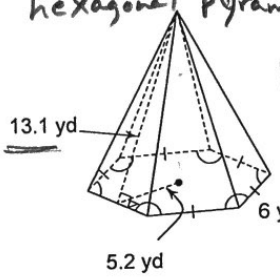
$SA = 144 + 2 \cdot \frac{1}{2} \cdot (6)(8)$
$= 144 + 48$
$= 192\ km^2$

11) sphere



$SA = 4\pi(2)^2$
$= 16\pi\ km^2$

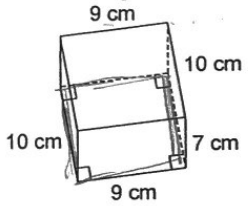
12) hexagonal pyramid



$LA = \frac{1}{2}(6 \cdot 6)(13.1)$
$= 235.8\ yd^2$

$SA = 235.8 + \frac{1}{2}(5.2)(6 \cdot 6$
$= 235.8 + 93.6$
$= 329.4\ yd^2$

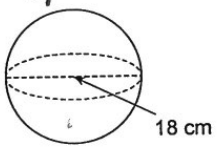
13) rectangular prism



$LA = (9+10+9+10)(7)$
$= (38)(7)$
$= 266\ cm^2$

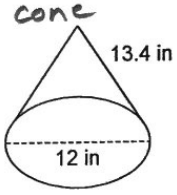
$SA = 266 + 2 \cdot 9 \cdot 10$
$= 266 + 180$
$= 446\ cm^2$

14) sphere



$SA = 4\pi(9)^2$
$= 324\pi\ cm^2$

15) cone

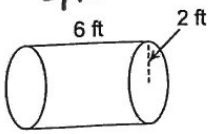


$LA = \frac{1}{2} \cdot \pi \cdot d \cdot l$
$= \pi r l$
$= \pi(6)(13.4)$
$= 80.4\pi\ in^2$

$SA = 80.4\pi + \pi(6)^2 = 80.4\pi + 36\pi = 116.4\pi\ in^2$

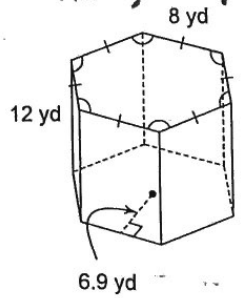
Find the volume of each figure. Round your answers to the nearest hundredth, if necessary.

16) cylinder



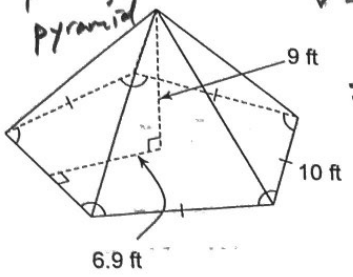
$V = B \cdot h$
$V = \pi(2)^2 \cdot 6$
$V = 24\pi\ ft^3$

17) hexagonal prism $\frac{1}{2}aP$



$V = \frac{1}{2}(6.9)(6.8)(12)$
$= 1987.2\ yd^3$

18) pentagonal pyramid

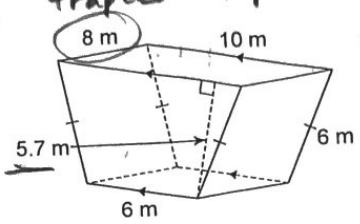


$V = \frac{1}{3} \cdot B \cdot h$

$= \frac{1}{3}\left(\frac{1}{2}\right)(6.9)(5 \cdot 10)(9)$

$= 517.5 \text{ ft}^3$

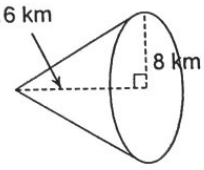
19) trapezoidal prism



$V = \frac{1}{2}(10+6)(5.7)(8)$

$= 364.8 \text{ m}^3$

20) cone

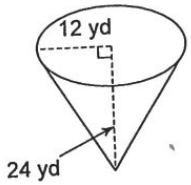


$V = \frac{1}{3}\pi(8)^2(16)$

$= \frac{1}{3} \cdot 1024\pi$

$= \frac{1024}{3}\pi \text{ km}^3$

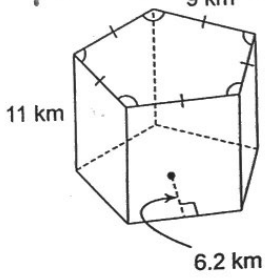
21) cone



$V = \frac{1}{3}\pi(12)^2(24)$

$= 1152\pi \text{ yd}^3$

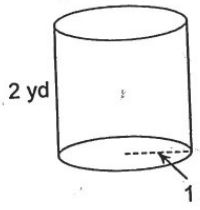
22) pentagonal prism



$V = \frac{1}{2}(6.2)(5.9)(11)$

$= 1534.5 \text{ km}^3$

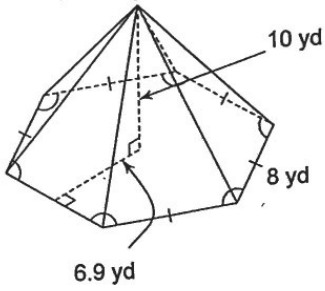
23) cylinder



$V = \pi(1)^2 2$

$= 2\pi \text{ yd}^3$

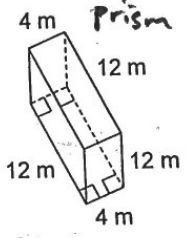
24) hexagonal pyramid



$V = \frac{1}{3} \cdot \frac{1}{2}(6.9)(6 \cdot 8)(10)$

$= 552 \text{ yd}^3$

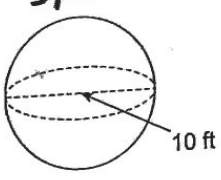
25) rectangular prism



$V = 4 \cdot 12 \cdot 12$

$= 576 \text{ m}^3$

26) sphere

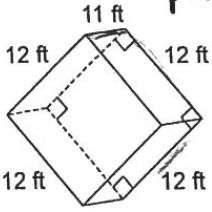


$V = \frac{4}{3}\pi r^3$

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

$= \frac{500}{3}\pi \text{ ft}^3$

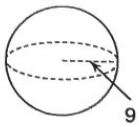
27) rectangular prism



$V = 11 \cdot 12 \cdot 12$

$= 1584 \text{ ft}^3$

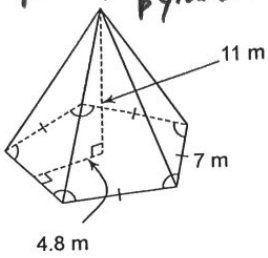
28)



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

$= 972\pi \text{ km}^3$

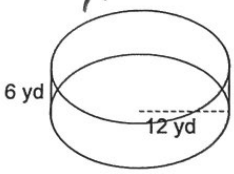
29) pentagonal pyramid



$V = \frac{1}{3} \cdot \frac{1}{2}(4.8)(5.7)(11)$

$= 308 \text{ m}^3$

30) cylinder



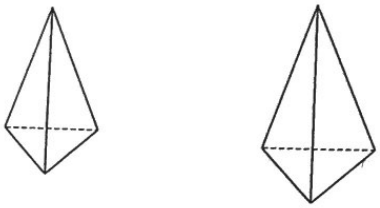
$V = \pi(12)^2(6)$

$= 864\pi \text{ yd}^3$

$\frac{a}{b} \Rightarrow \frac{a^2}{b^2} \Rightarrow \frac{a^3}{b^3}$ (SA, V)

Each pair of figures is similar. Use the information given to find the scale factor of the figure on the left to the figure on the right.

31)

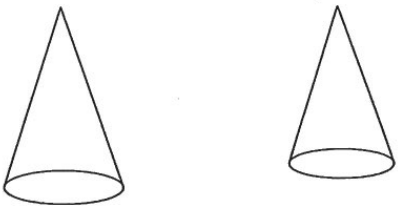


$V = 9261 \text{ in}^3$

$V = 13824 \text{ in}^3$

$\sqrt[3]{\frac{9261}{13824}} = \frac{7}{8}$

32)

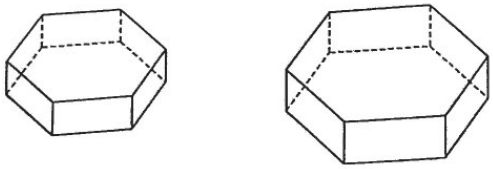


$V = 3888\pi \text{ mi}^3$

$V = 18\pi \text{ mi}^3$

$\sqrt[3]{\frac{3888\pi}{18\pi}} = \frac{6}{1}$

33)

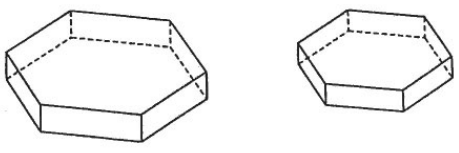


$V = 1375 \text{ km}^3$

$V = 2376 \text{ km}^3$

$\sqrt[3]{\frac{1375}{2376}} = \frac{5}{6}$

34)

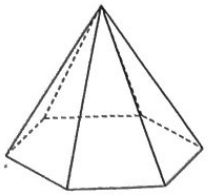


$V = 5832 \text{ mi}^3$

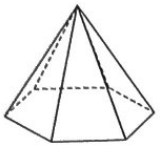
$V = 512 \text{ mi}^3$

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

35)



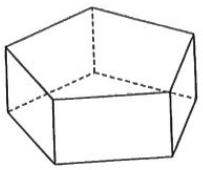
V = 621 in³



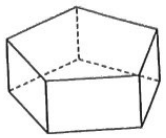
V = 23 in³

$\sqrt[3]{\frac{621}{23}} = \frac{3}{1}$

36)



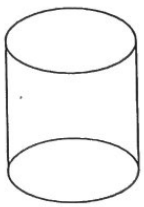
SA = 490 ft²



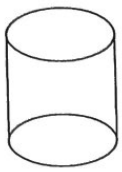
SA = 360 ft²

$\sqrt{\frac{490}{360}} = \frac{7}{6}$

37)



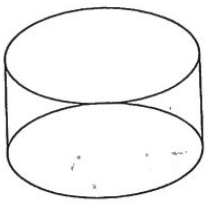
SA = 1400π km²



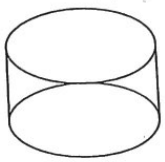
SA = 224π km²

$\sqrt{\frac{1400\pi}{224\pi}} = \frac{5}{2}$

38)



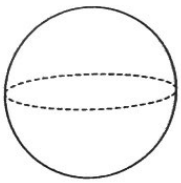
SA = 1280π yd²



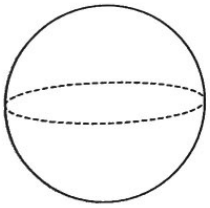
SA = 20π yd²

$\sqrt{\frac{1280\pi}{20\pi}} = \frac{8}{1}$

39)



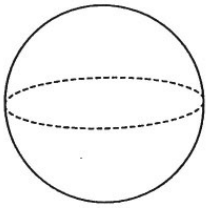
SA = 576π yd²



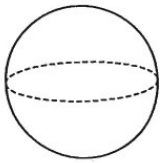
SA = 729π yd²

$\sqrt{\frac{576\pi}{729\pi}} = \frac{8}{9}$

40)



SA = 240π m²

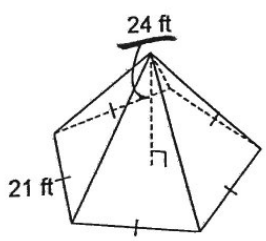


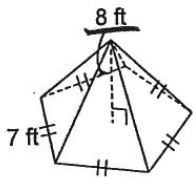
SA = 60π m²

$\sqrt{\frac{240\pi}{60\pi}} = \sqrt{\frac{4}{1}} = \frac{2}{1}$

Each pair of figures is similar. Find the scale factor of the figure on the left to the figure on the right. Then find the ratio of surface areas and the ratio of volumes.

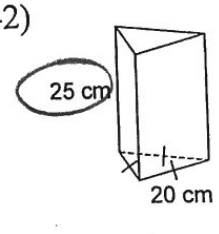
41)

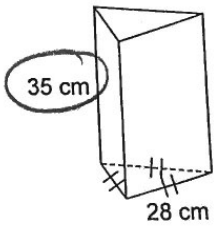




$\frac{24}{8} = \frac{SF}{3}{1} \Rightarrow \frac{SA}{9}{1} \Rightarrow \frac{V}{27}{1}$

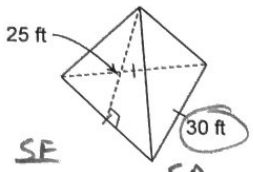
42)

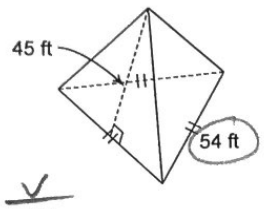




$\frac{25}{35} = \frac{SF}{5}{7} \Rightarrow \frac{SA}{25}{49} \Rightarrow \frac{V}{125}{343}$

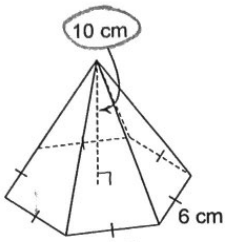
43)

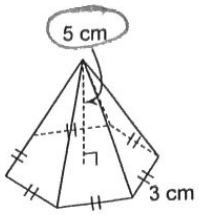




$\frac{30}{54} = \frac{SF}{5}$ $\frac{5}{9}$ $\Rightarrow$ $\frac{SA}{25}$ $\frac{25}{81}$ $\Rightarrow$ $\frac{V}{125}$ $\frac{125}{729}$

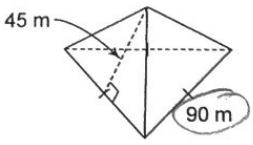
44)

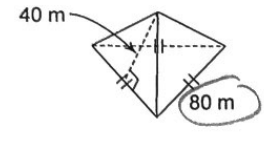




$\frac{10}{5} = \frac{SF}{2}$ $\frac{2}{1}$ $\Rightarrow$ $\frac{SA}{4}$ $\frac{4}{1}$ $\Rightarrow$ $\frac{V}{8}$ $\frac{8}{1}$

45)





$\frac{90}{80} = \frac{SF}{9}$ $\frac{9}{8}$ $\Rightarrow$ $\frac{SA}{81}$ $\frac{81}{64}$ $\Rightarrow$ $\frac{V}{729}$ $\frac{729}{512}$

(*) get scale factor FIRST !

Some information about the surface area and volume of two similar solids has been given. Find the missing value.

46) Solid #1: SA = 2 m², V = 8 m³ Solid #2: SA = 128 m², V = ?

$\frac{2}{128} = \frac{1}{64} \overset{SF}{=} \frac{1}{8} \Rightarrow \frac{V}{8^3} = \frac{1}{512}$ $\frac{1}{512} = \frac{8}{x}$ $x = 4096\ m^3$

47) Solid #1: SA = 468 km², V = 1080 km³ Solid #2: SA = 13 km², V = ?

$\frac{468}{13} = \frac{36}{1} \overset{SF}{=} \frac{6}{1} \Rightarrow \frac{V}{6^3} = \frac{216}{1}$ $\frac{216}{1} = \frac{1080}{x}$ $216x = 1080$ $x = 5\ km^3$

48) Solid #1: SA = 6 yd², V = 7 yd³ Solid #2: SA = 600 yd², V = ?

$\frac{6}{600} = \frac{1}{100} \overset{SF}{\Rightarrow} \frac{1}{10} \Rightarrow \frac{V}{10^3} = \frac{1}{1000}$ $\frac{1}{1000} = \frac{7}{x}$ $x = 7000\ yd^3$

49) Solid #1: SA = 448 yd², V = 14336 yd³ Solid #2: SA = 7 yd², V = ?

$\frac{448}{7} = \frac{64}{1} \overset{SF}{=} \frac{8}{1} \Rightarrow \frac{V}{8^3} = \frac{512}{1}$ $\frac{512}{1} = \frac{14336}{x}$ $512x = 14336$ $x = 28\ yd^3$

50) Solid #1: SA = 900 ft², V = 26000 ft³ Solid #2: SA = 576 ft², V = ?

$\frac{900}{576} = \frac{100}{64} = \frac{25}{16} \overset{SF}{=} \frac{5}{4} \Rightarrow \frac{V}{4^3} = \frac{125}{64}$ $\frac{125}{64} = \frac{26000}{x}$ $125x = 1664000$ $x = 13312\ ft^3$

51) Solid #1: SA = 144 cm², V = 5616 cm³ Solid #2: SA = ?, V = 1664 cm³

$\sqrt[3]{\frac{5616}{1664}} = \frac{3}{2} \Rightarrow \frac{SA}{4}$ $\frac{9}{4} = \frac{144}{x}$ $9x = 576$ $x = 64\ cm^2$

52) Solid #1: SA = 684 in², V = 4752 in³ Solid #2: SA = ?, V = 594 in³

$\frac{4752}{594} = \sqrt[3]{\frac{8}{1}} \overset{SF}{=} \frac{2}{1} \Rightarrow \frac{SA}{2^2} = \frac{4}{1}$ $\frac{4}{1} = \frac{684}{x}$ $4x = 684$ $x = 171\ in^2$

53) Solid #1: SA = 117 cm², V = 540 cm³ Solid #2: SA = ?, V = 6860 cm³

$\frac{540}{6860} = \sqrt[3]{\frac{27}{343}} = \frac{3}{7} \overset{SF}{\Rightarrow} \frac{SA}{3^2} = \frac{9}{49}$ $\frac{9}{49} = \frac{117}{x}$ $9x = 5733$ $x = 637\ cm^2$

54) Solid #1: SA = 300 m², V = 29000 m³ Solid #2: SA = ?, V = 29 m³

$\frac{29000}{29} = \sqrt[3]{\frac{1000}{1}} = \frac{10}{1} \overset{SF}{\Rightarrow} \frac{SA}{10^2} = \frac{100}{1}$ $\frac{100}{1} = \frac{300}{x}$ $100x = 300$ $x = 3\ m^2$

55) Solid #1: SA = 648 ft², V = 3888 ft³ Solid #2: SA = ?, V = 486 ft³

$\frac{3888}{486} = \sqrt[3]{\frac{8}{1}} = \frac{2}{1} \overset{SF}{\Rightarrow} \frac{SA}{2^2} = \frac{4}{1}$ $\frac{4}{1} = \frac{648}{x}$ $4x = 648$ $x = 162\ ft^2$