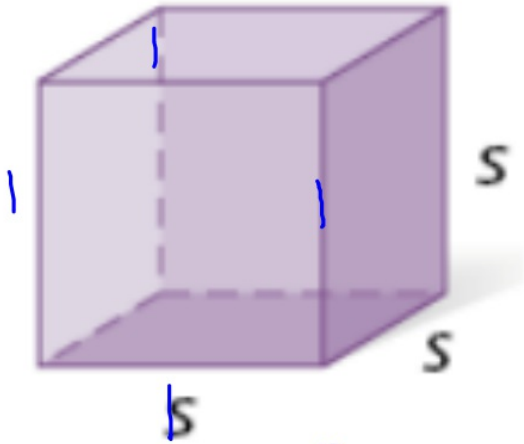
A cube has side length 1cm



Find the area of one of the faces of the cube.

$1 \cdot 1 = 1$ cm^2

Find the volume of the cube.

$1 \cdot 1 \cdot 1 = 1$ cm^3

1^3

SF $\frac{1}{1}$ Area Factor $\frac{s^2}{s^2}$

A cube has side length 2cm

Volume Factor $\frac{s^3}{s^3}$

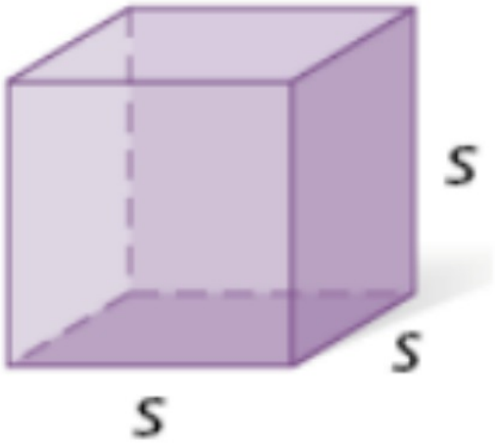
Find the area of one of the faces of the cube.

$2 \cdot 2 = 4$ cm^2

Find the volume of the cube.

$2 \cdot 2 \cdot 2 = 8$ cm^3

A cube has side length 3cm



Find the area of one of the faces of the cube.

$3 \cdot 3 = 9\ cm^2$

Find the volume of the cube.

$3 \cdot 3 \cdot 3 = 27\ cm^3$

SF (sides) $\frac{3}{5}$ AF $\frac{9}{25}$

VF: $\frac{27}{125}$

A cube has side length 5cm

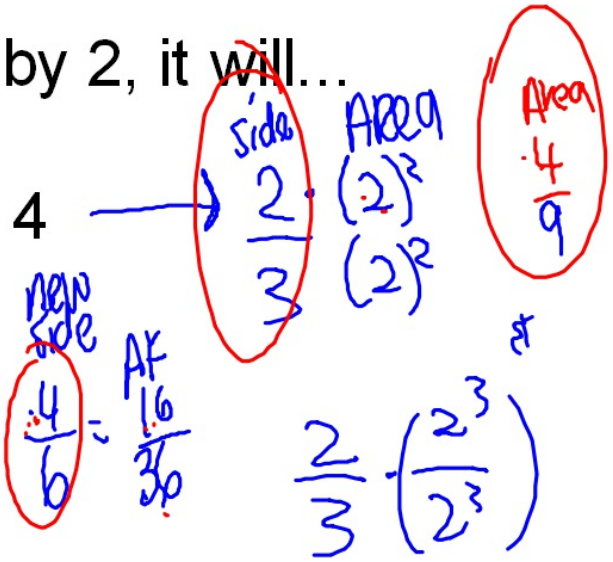
Find the area of one of the faces of the cube. $5 \cdot 5 = 25\ cm^2$

Find the volume of the cube. $5 \cdot 5 \cdot 5 = 125\ cm^3$

If you multiply the side lengths of a solid by 2, it will…

Multiply the area of a face of the solid by 4

Multiply the volume of the solid by 8



Fill in the chart

Length of edges	1	2	4
Area of faces	1	4 2^2	16 4^2
Volume	1	8 2^3	64 4^3

When comparing two figures…

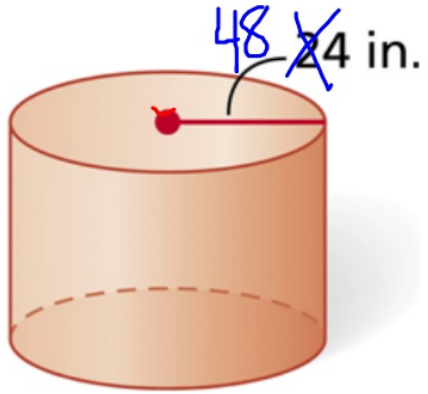
If the ratio between the lengths is	$a : b$
Then the ratio between the areas is	$a^2 : b^2$
And the ratio between the volumes is	$a^3 : b^3$

2304
new $V = \pi(48)^2(66)$
$152{,}064\pi$

If the radius and height are doubled, describe the effect on the volume

2^3 = 8 times bigger volume

576
orig $V = \pi(24)^2(33)$
$V = 19008\pi$
$\times 8$
$152{,}064\pi$



If the radius and height are multiplied by 2/3, describe the effect on the volume

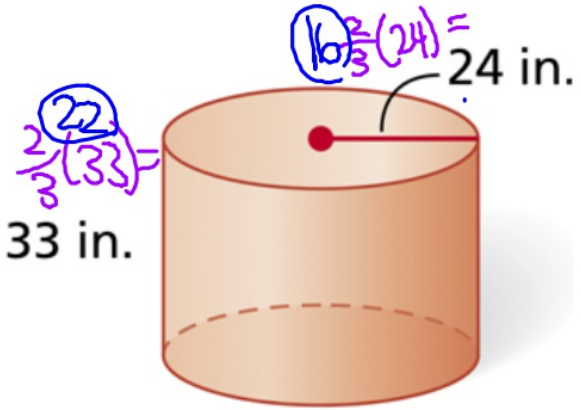
$V = \frac{2^3}{3^3} = \frac{8}{27}$ smaller

$V = \pi r^2 h$

$V = 19{,}008\pi$

$\frac{8}{27} \cdot \frac{19{,}008}{1} \pi$

new volume 5632π

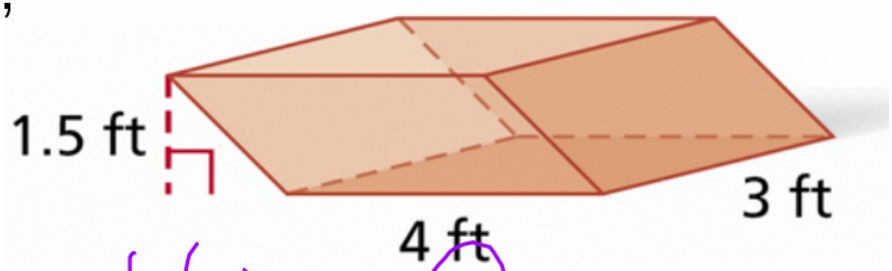


If all the lengths are mulitipled by 5, describe the effect on the volume

volume

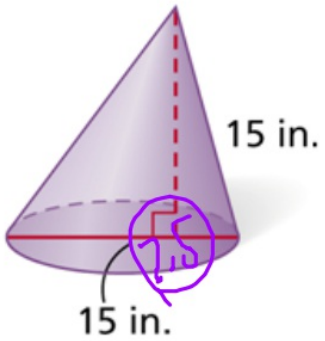
$5 \cdot 5 \cdot 5 = 125$ bigger

New Vol $= 18 \cdot 125 = 2{,}250$



$V = (1.5)(4)(3) = 18$

The diameter and height of the cone are divided by 3. Describe the effect on the volume.



$\frac{1^3}{3^3} = \frac{1}{27}$ Volume dividing by 27 or mult. 1/27

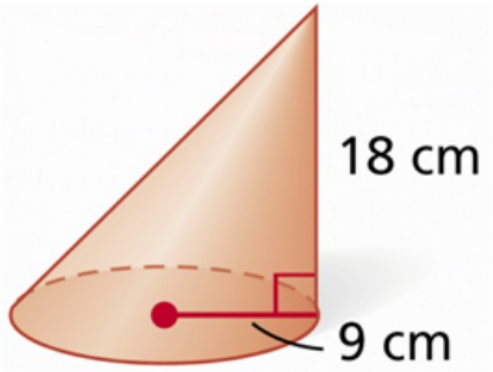
Smaller

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

The radius and height of the cone are quadrupled. Describe the effect on the volume.

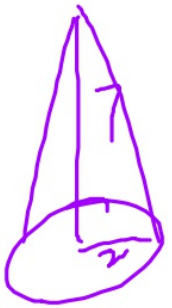
$4 \rightarrow 4 \cdot 4 \cdot 4 = \boxed{64}$

times bigger



A cone has radius 2 in. and height 7 in. If the radius and height are multiplied by 4, describe the effect on the volume.

$4 \cdot 4 \cdot 4 = \boxed{64}$



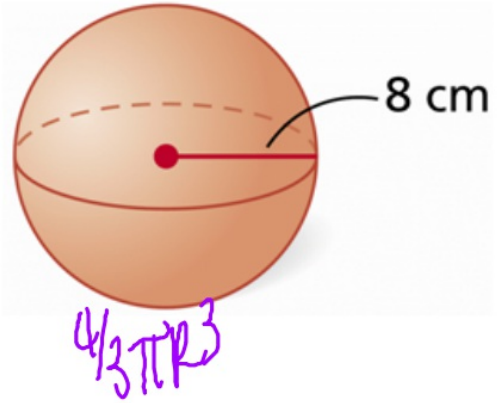
$\frac{1}{3}(2)^2 \cdot 7\pi$

$\frac{4 \cdot 7\pi}{3}$

$\boxed{\frac{28}{3}\pi}$

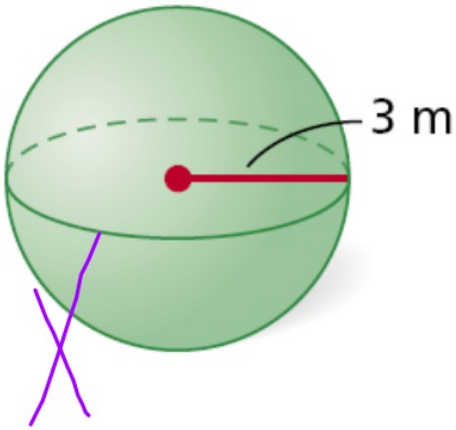
The radius of the sphere is multiplied by 3/4. Describe the effect on the volume.

$\frac{3}{4} \rightarrow \frac{3^3}{4^3} = \frac{27}{64}$



The radius of the sphere is multiplied by 3. Describe the effect on the surface area.

$3 \rightarrow 3^2 = 9$ area, times bigger

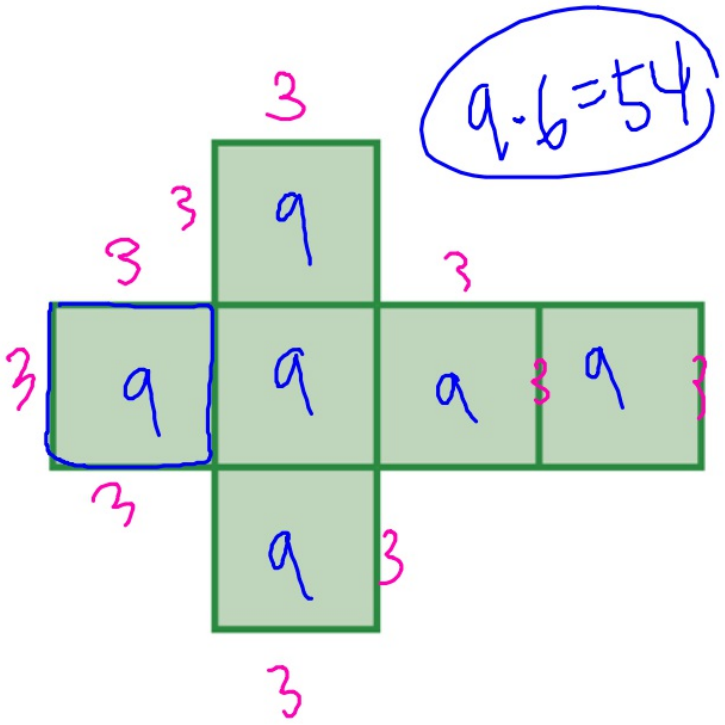


Surface Area

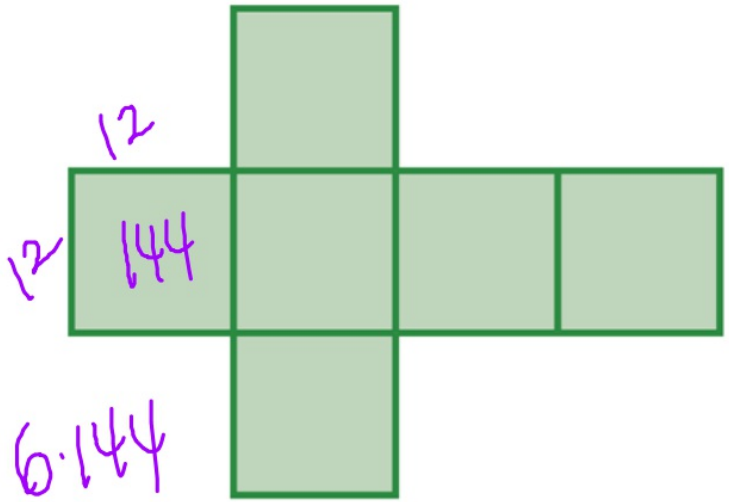
The sum of all the shapes that cover the surface of a solid

The area net to the right will make which solid? Cube

If the length of each edge is 3 cm, what is the surface area?

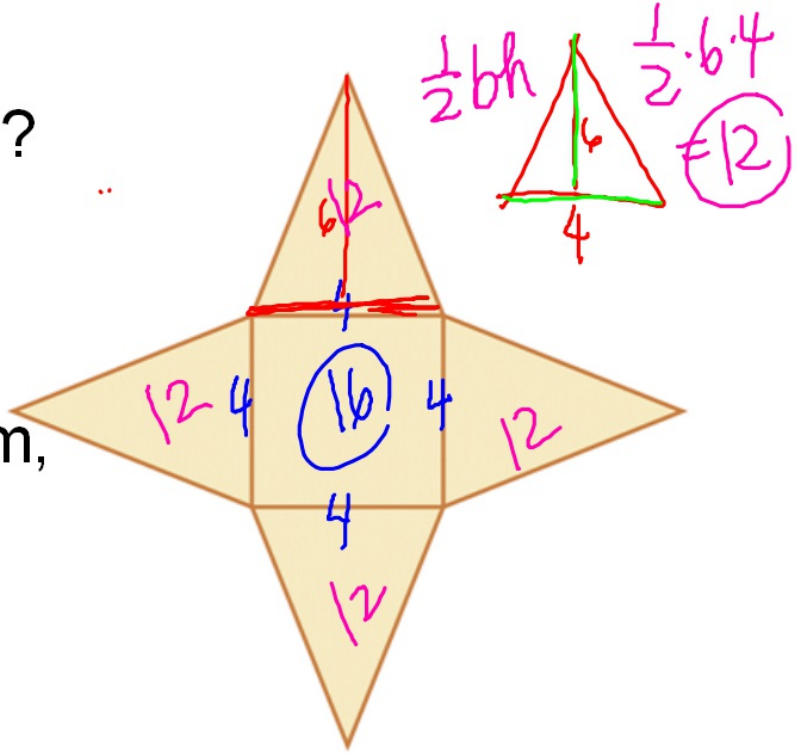


If the length of each edge is 12 cm, what is the surface area?



$864\ cm^2$

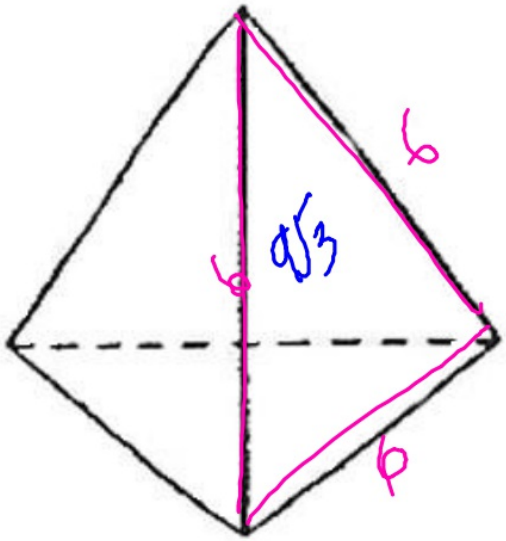
What solid can be made with this net?



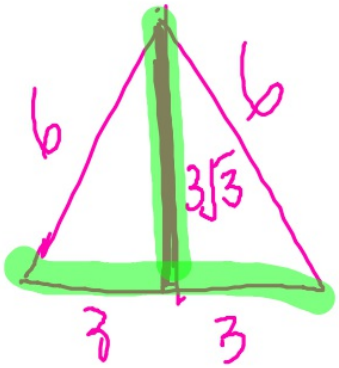
If the edges of the square are 4 cm and the height of each triangle is 6 cm, what is the surface area?

$64\ cm^2$

What is the area net for the solid?
Assume all triangles are equilateral.

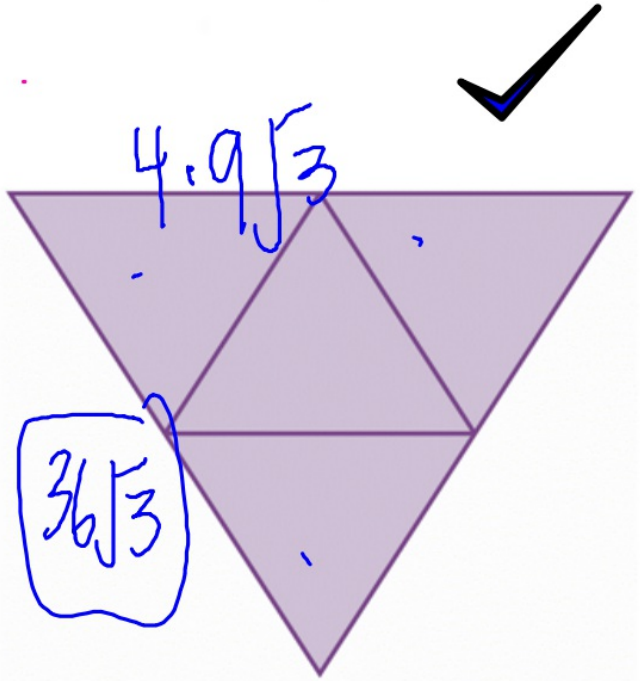


If the length of one edge is 6, find the surface area of the triangular pyramid.



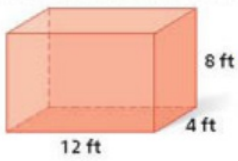
$\frac{1}{2}(6)(3\sqrt{3})$

$= 9\sqrt{3}$



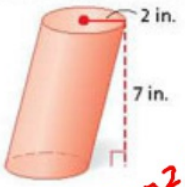
Describe the effect of each change on the volume of the given figure.

9. The dimensions are multiplied by $\frac{1}{4}$.



$\frac{1^3}{4^3} = \frac{1}{64}$ smaller

10. The dimensions are tripled.



$3^3 = 27$ times Bigger

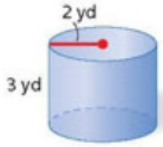
$\pi R^2 h$

$\pi 2 \cdot 2 \cdot 7$

$\pi 2 \cdot 3 \cdot 2 \cdot 3 \cdot 7 \cdot 3$

Describe the effect of each change on the volume of the given figure.

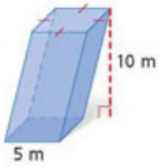
20. The dimensions are multiplied by 5.



$5^3 = 125$

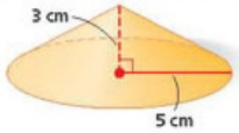
$2(5) \cdot 2(5) \cdot 3(5)\pi$

21. The dimensions are multiplied by $\frac{3}{5}$.



Describe the effect of each change on the volume of the given figure.

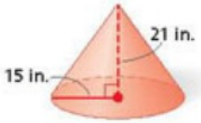
9. The dimensions are tripled.



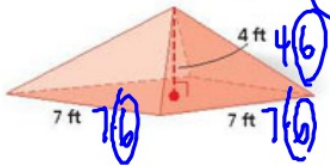
10. The dimensions are multiplied by $\frac{1}{2}$.

Describe the effect of each change on the volume of the given figure.

20. The dimensions are multiplied by $\frac{1}{3}$.



21. The dimensions are multiplied by 6.



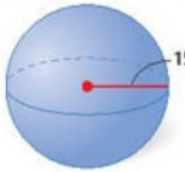
$6^3 =$

Online
p753 #9-10, 20-21
p761 #9-10, 20-21
p770 #9-10, 20-21

Describe the effect of each change on the given measurement of the figure.

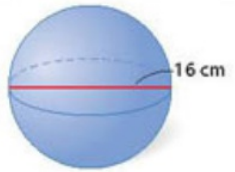
9. surface area

The dimensions are doubled. $2^2 = 4$



10. volume

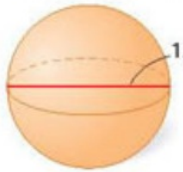
The dimensions are multiplied by $\frac{1}{4}$.



Describe the effect of each change on the given measurement of the figure.

20. surface area

The dimensions are multiplied by $\frac{1}{5}$.



21. volume

The dimensions are multiplied by 6.