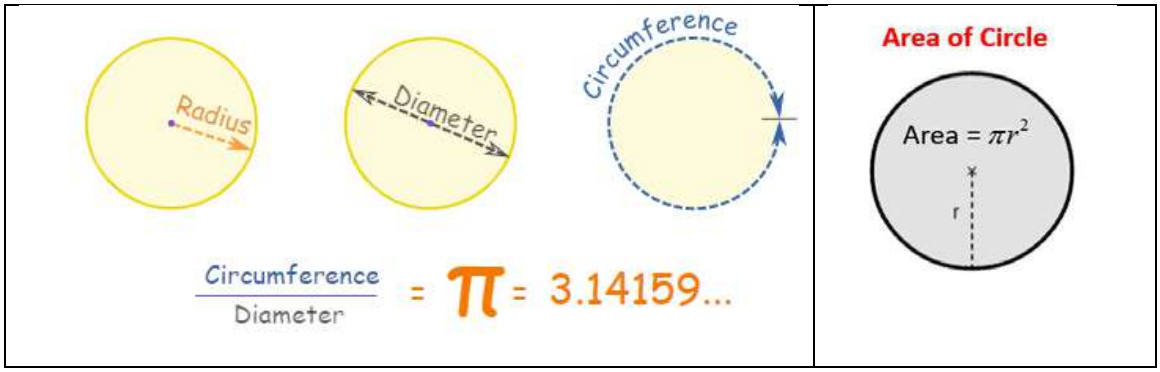
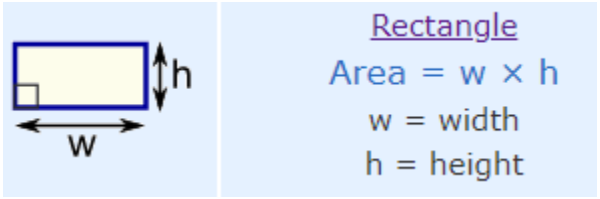
Math 8th Grade Week 4

Review Section

1. Area of Circles

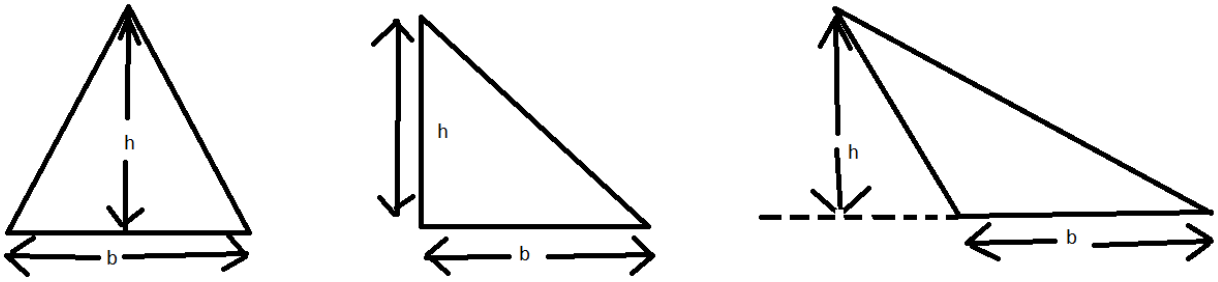


2. Area of Rectangles (including squares which are a special type of rectangle)



Note: This works for a square also since a square is a type of rectangle where w = h.

3. Area of Triangles



Area = ½ b x h
NOTICE: the height is not necessarily the length of one of the sides. It is HOW TALL the triangle is.

New Stuff – Calculating the volume of prisms

1. **Definitions**

Volume: How much space an object takes up. Or, if we think of them as a box, how much stuff we can put inside that box.

Prism: Simply speaking, we can think of a prism as being a box.

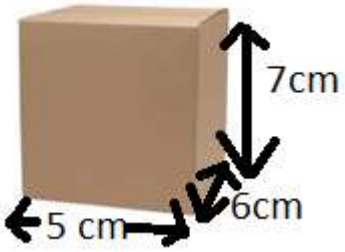
Right Prisms (and cones and pyramids): Right meaning that from the centre of the bottom to the centre of the top is a 90 degree angle (i.e. not crooked).

Formula time: for ALL rectangular prism

V = area of the base x height

Pyramids and cones: It is helpful, as we'll see later, to think of pyramids a cones as being pointy prisms/boxes.

Right rectangular prism (rectangular because the bottom is a rectangle).

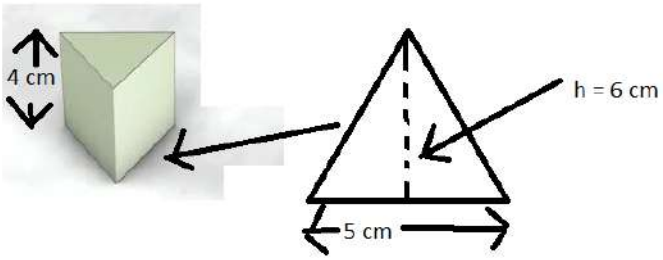


V = area of base x height
The base is a rectangle so A = l x w
5cm x 6 cm = 30 cm^2

Volume = 30 cm^2 x 7cm

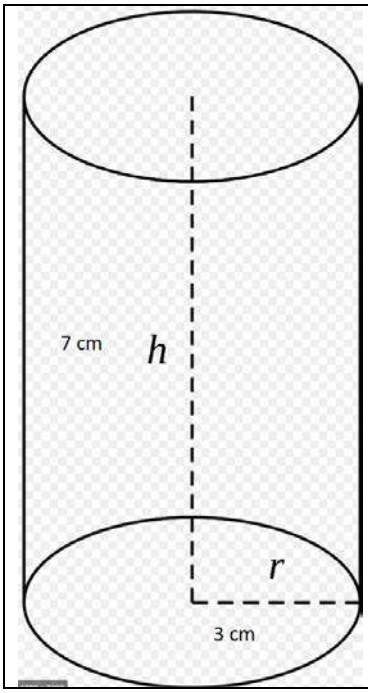
Volume = 210 cm^3

Right triangular prisms (triangular because the bottom is a triangle).



V = area of base x height
The base is a triangle so A = $\frac{1}{2}\ x\ b\ x\ h \frac{1}{2} x\ 5\ cm\ x\ 6\ cm$
= 15 cm^2
V = 15 cm^2 x 4cm
Volume = 60 cm^3

Right cylinders



V = area of base x height

The base is a circle so

A = $\pi\ x\ r^2$ we'll use π $\approx$ 3.14

A $\approx$ 3.14 x 4 cm x 4 cm $\approx$ 50.24 v

Volume $\approx$ 50.24 $cm^2\ x\ 7\ cm$

Volume $\approx$ 351.68 cm^3

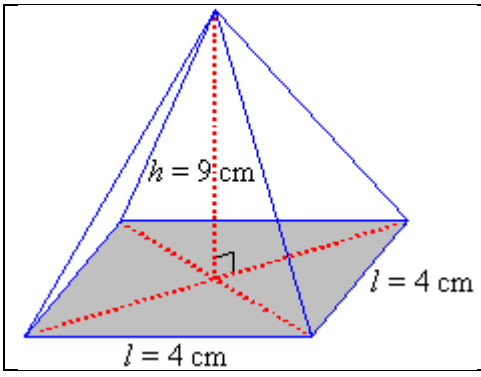
Notice I used $\approx$ (approximate) throughout the problem since we used an approximation of the value of $\boldsymbol{\pi}$.

Pyramids and cones

The volume of a pyramid (including cones) is calculated the same was as prisms except the volume is of pyramids and cones is $\frac{1}{3}$ of the prism.

V = $Area\ of\ the\ base\ x\ height\ x\frac{1}{3}$

Notice the first part is exactly the same as a prism.



V = area of base x height x $\frac{1}{3}$

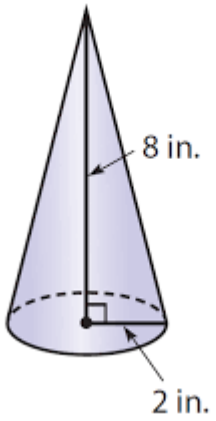
V = 4cm x 4cm x 9cm x $\frac{1}{3}$

V = 48 cm^3

In the case of a cone it would be the same except the base is a circle

V = $\boldsymbol{Area\ of\ the\ base\ x\ height\ x\frac{1}{3}}$

Notice the first part is exactly the same as a prism.



V = area of base x height x $\frac{1}{3}$

V $\approx$ **2 in x 2 in x 3.14 x 8cm** x $\frac{1}{3}$

V $\approx$ 100.48 cm^3

Videos

Volume introduction

https://www.khanacademy.org/math/basic-geo/basic-geo-volume-sa/volume-rect-prism/v/how-we-measure-volume

Volume of prisms

https://www.khanacademy.org/math/geometry/hs-geo-solids/hs-geo-solids-intro/v/solid-geometry-volume

Volume of cones

https://www.khanacademy.org/math/basic-geo/basic-geo-volume-sa/volume-cones/v/volume-cone-example

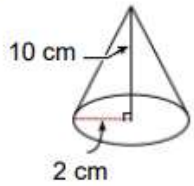
Volume of pyramids

https://www.khanacademy.org/math/geometry/hs-geo-solids/hs-geo-2d-vs-3d/v/vertical-slice-of-rectangular-pyramid

Worksheet Week 4

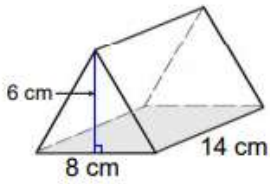
Find the volume of each figure. Round answers to the nearest hundredth, if necessary.

1)



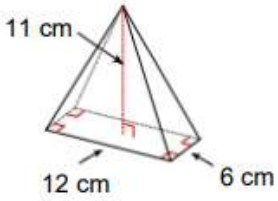
Volume: _____

2)



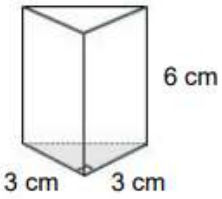
Volume: _____

3)



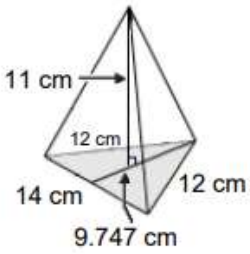
Volume: _____

4)



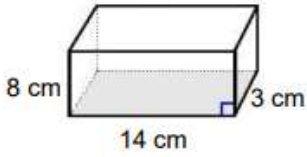
Volume: _____

5)



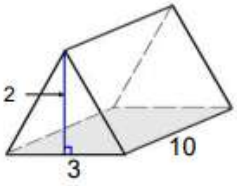
Volume: _____

6)



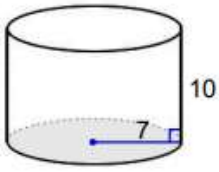
Volume: _____

7)



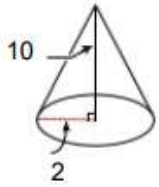
Volume: _____

8)



Volume: _____

9)



Volume: _____

Math 8th Grade Week 5

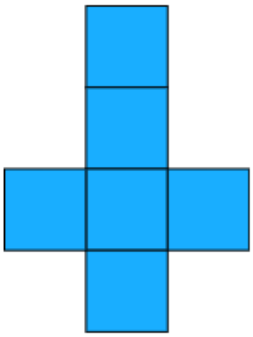
New Stuff – Calculating surface area

1. **Definitions**

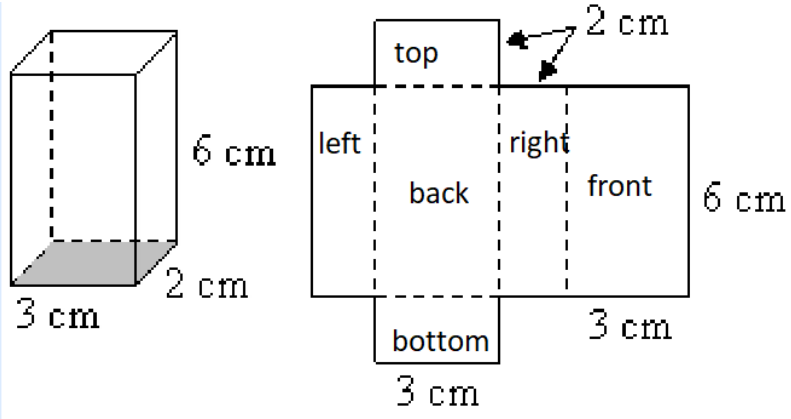
   Surface Area:

The total area of the surface of a three-dimensional object.

Example: the surface area of a cube is the area of all 6 faces added together.



Area of Right rectangular prism (rectangular because the bottom is a rectangle).

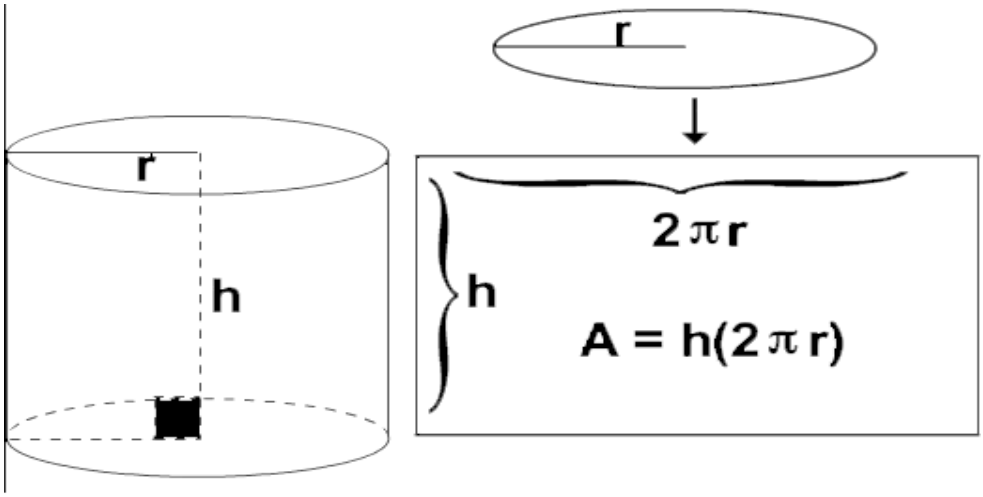


The total surface area(SA) = area of all sides added up
SA = top + bottom + left + right + front + back

Area of the top = 3cm x 2cm =6 cm^2
Area of the bottom = area of the top = 6 cm^2
Area of the left = 2 cm x 6 cm = 12 cm^2
Area of the right = area of the left
Area of the front = 3 cm x 6 cm = 18 cm^2
Area of the back = Area of the front

SA = 6 cm^2 + 6 cm^2 + 12 cm^2 + 12 cm^2 + 18 cm^2 + 18 cm^2
= 72 cm^2

Surface Area of a cylinder

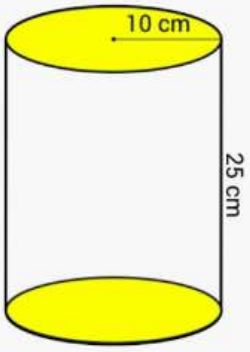


$$A = 2\pi r^2 + h(2\pi r)$$

areas of top and bottom circles

area of retangle

Calculate the surface area of the cylinder in terms of π.



$$2\pi r^2 + 2\pi rh$$

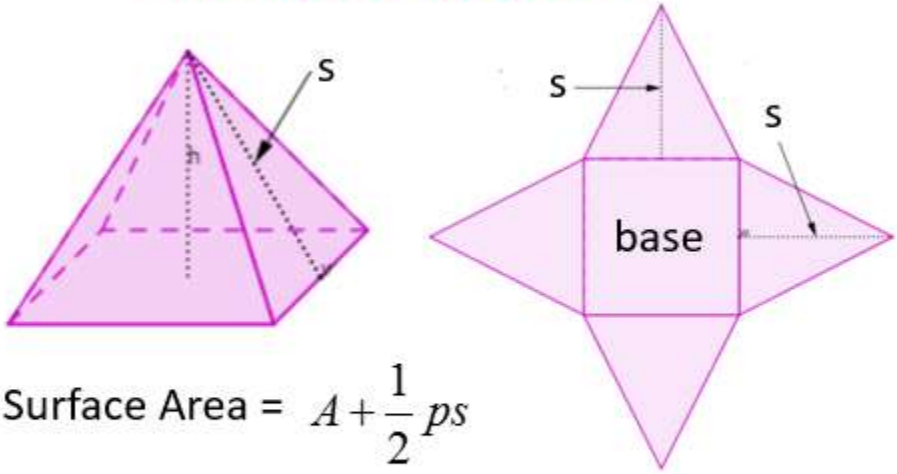
$$= 2\pi(10)^2 + 2\pi(10)(25)$$

$$= 200\pi$$

It's fine to leave π as is rather than approximating it to 3.14.

Surface area of a pyramid

Surface Area of Pyramid



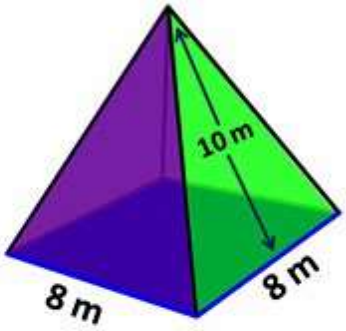
Surface Area = $A + \frac{1}{2}ps$

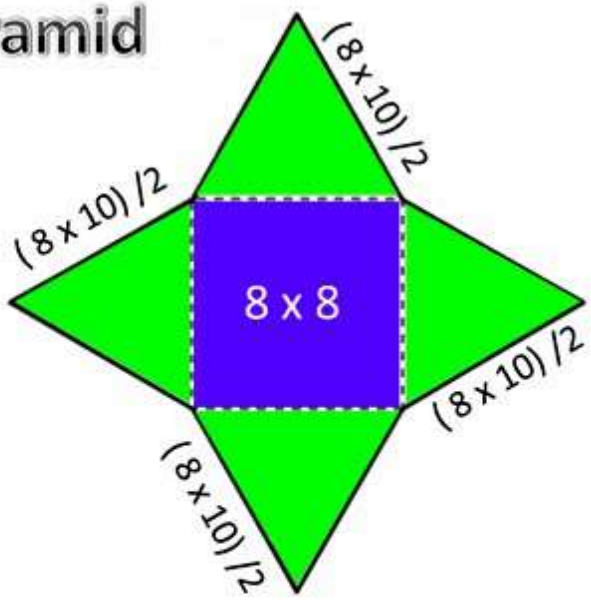
A = Area of base

p = perimeter of base

s = slant height which is NOT the height of the pyramid!!!!!

Square Base Pyramid





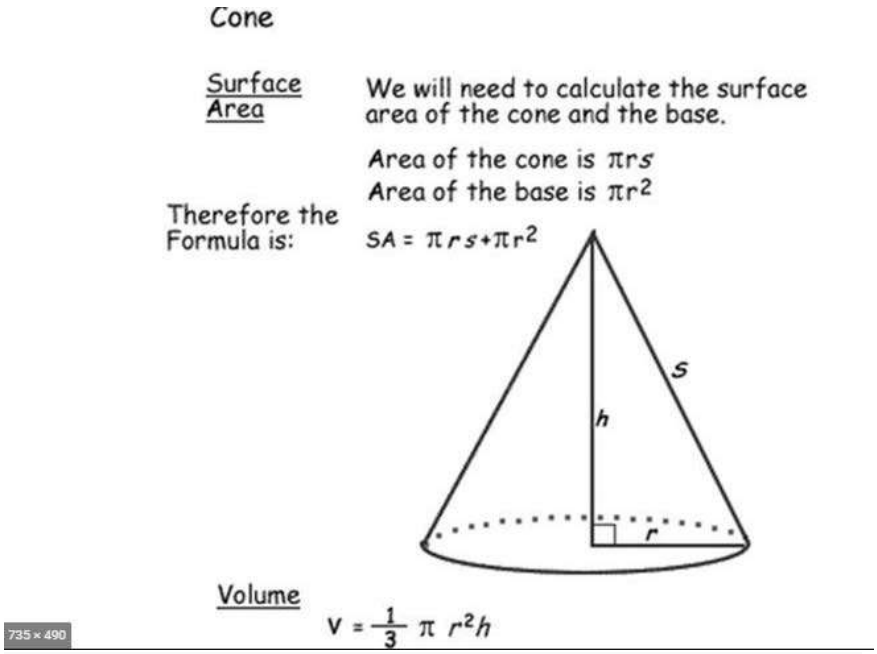
The "Total Surface Area" =

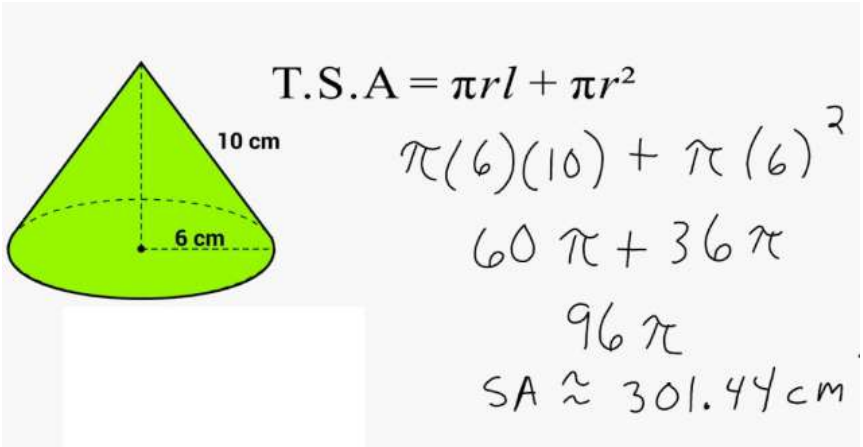
4 x (8 x 10) /2 : Four Green Triangles

+ **1 x** (8 x 8) : One Blue Purple Square

= 4x40 + 1x64 = **224 m²** ✓

Surface Area of a cone





Videos:

Surface area of a prism

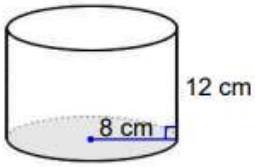
https://www.khanacademy.org/science/ap-biology/cell-structure-and-function/cell-size/v/surface-area-of-a-box

Volume and surface area

https://www.khanacademy.org/math/basic-geo/basic-geo-volume-sa

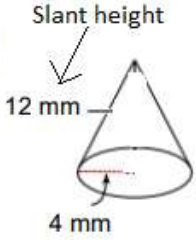
Worksheet Week 5

1)



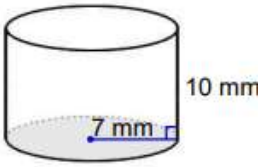
Surface Area _____

2)



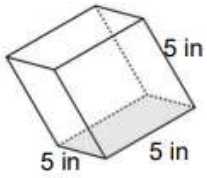
Surface Area _____

3)



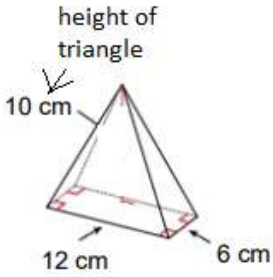
Surface Area _____

4)



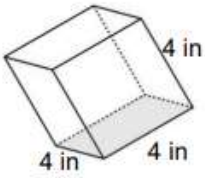
Surface Area _____

5)



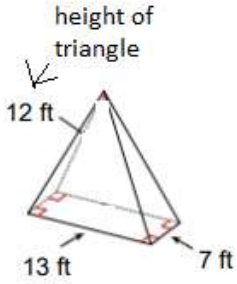
Surface Area _____

6)



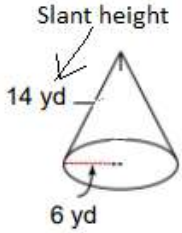
Surface Area _____

7)



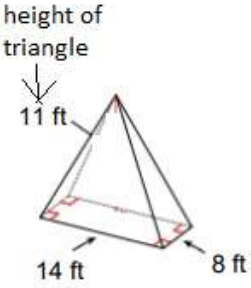
Surface Area _____

8)



Surface Area _____

9)



Surface Area _____