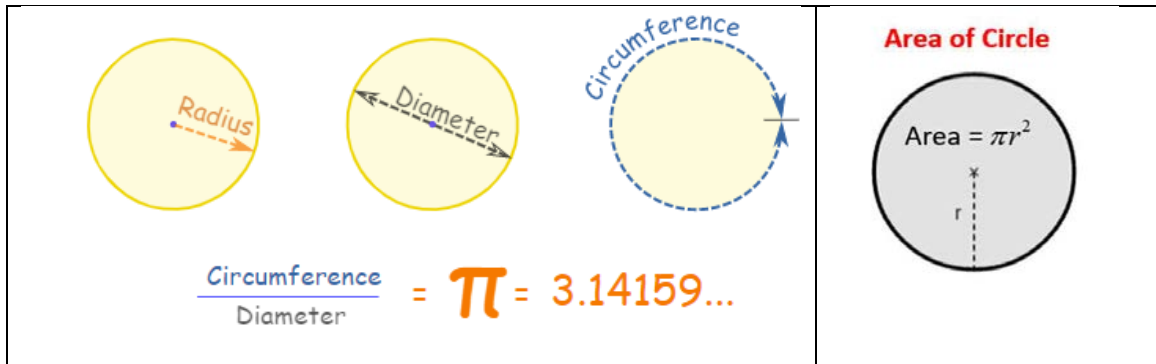


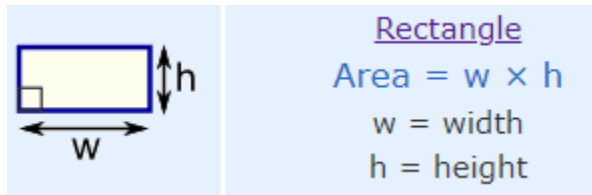
Math 8th Grade Week 4

Review Section

1. Area of Circles

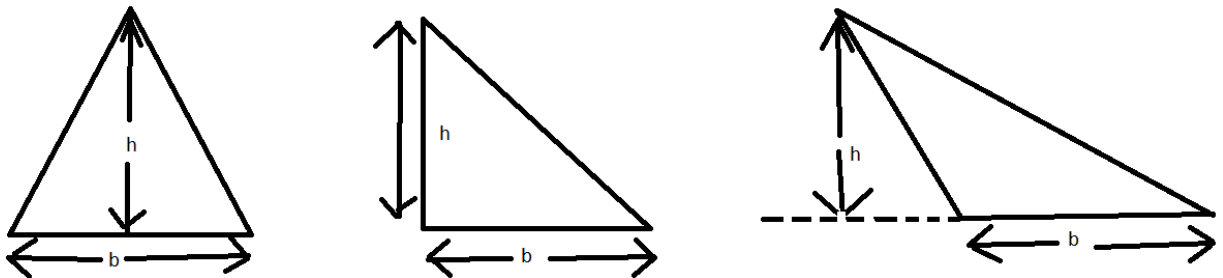


2. Area of Rectangles (including squares which are a special type of rectangle)



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

3. Area of Triangles



$$\text{Area} = \frac{1}{2} b \times h$$

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

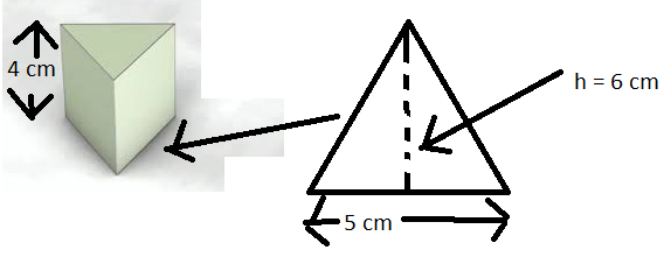
$V = \text{area of the base} \times \text{height}$

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

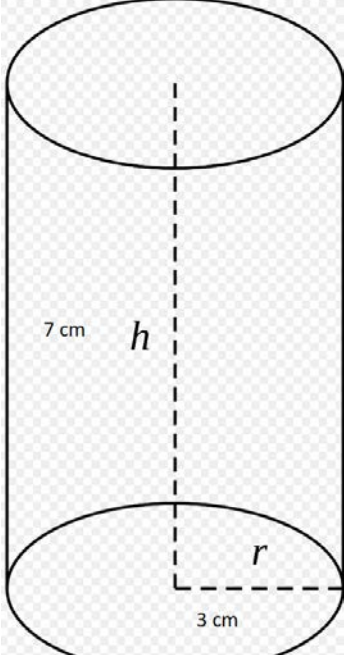
Right rectangular prism (rectangular because the bottom is a rectangle).

	<p>$V = \text{area of base} \times \text{height}$ The base is a rectangle so $A = l \times w$ $5\text{cm} \times 6\text{cm} = 30\text{cm}^2$</p> <p>Volume = $30\text{cm}^2 \times 7\text{cm}$</p> <p>Volume = 210cm^3</p>
---	--

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

	<p>$V = \text{area of base} \times \text{height}$ The base is a triangle so $A =$ $\frac{1}{2} \times b \times h = \frac{1}{2} \times 5\text{cm} \times 6\text{cm}$ $= 15\text{cm}^2$</p> <p>$V = 15\text{cm}^2 \times 4\text{cm}$ Volume = 60cm^3</p>
--	---

Right cylinders

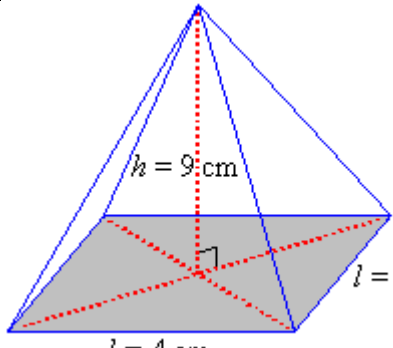
 <p>A diagram of a right circular cylinder. A vertical dashed line represents the height, labeled 'h' and '7 cm'. A horizontal dashed line from the center of the bottom circular base to the edge represents the radius, labeled 'r' and '3 cm'.</p>	<p>$V = \text{area of base} \times \text{height}$ The base is a circle so $A = \pi \times r^2$ we'll use $\pi \approx 3.14$ $A \approx 3.14 \times 4 \text{ cm} \times 4 \text{ cm} \approx 50.24 \text{ } \nu$</p> <p>Volume $\approx 50.24 \text{ cm}^2 \times 7 \text{ cm}$</p> <p>Volume $\approx 351.68 \text{ cm}^3$</p> <p>Notice I used \approx (approximate) throughout the problem since we used an approximation of the value of π.</p>
---	--

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.

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

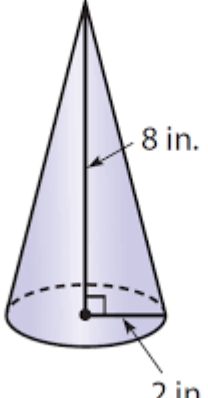
Notice the first part is exactly the same as a prism.

 <p>A diagram of a square pyramid. A vertical dashed red line from the apex to the center of the square base represents the height, labeled 'h = 9 cm'. A right-angle symbol is shown at the base of this height line. The side length of the square base is labeled 'l = 4 cm' on two adjacent sides.</p>	<p>$V = \text{area of base} \times \text{height} \times \frac{1}{3}$ $V = 4 \text{ cm} \times 4 \text{ cm} \times 9 \text{ cm} \times \frac{1}{3}$ $V = 48 \text{ cm}^3$</p>
---	---

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

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

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

 <p>A diagram of a cone with a vertical height of 8 in. and a radius of 2 in. The height is indicated by a vertical line from the apex to the center of the base, and the radius is indicated by a horizontal line from the center to the edge of the base. A right-angle symbol is shown at the center of the base.</p>	$V = \text{area of base} \times \text{height} \times \frac{1}{3}$ $V \approx 2 \text{ in} \times 2 \text{ in} \times 3.14 \times 8 \text{ cm} \times \frac{1}{3}$ $V \approx 100.48 \text{ cm}^3$
---	---

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>

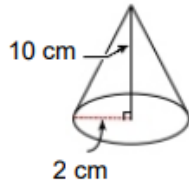
Volume of pyramids

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

Worksheet Week 4

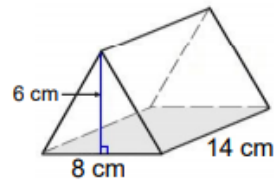
Find the volume of each figure. Round answers to the nearest hundredth, if necessary.

1)



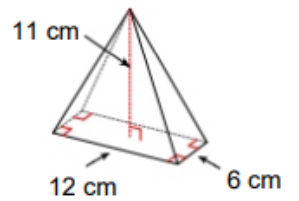
Volume: _____

2)



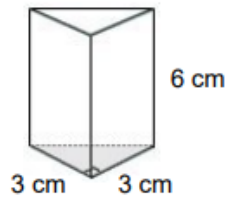
Volume: _____

3)



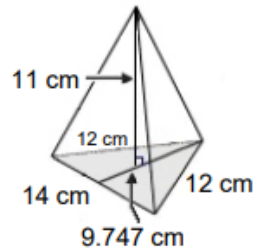
Volume: _____

4)



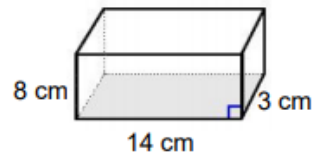
Volume: _____

5)



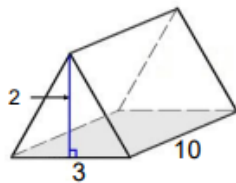
Volume: _____

6)



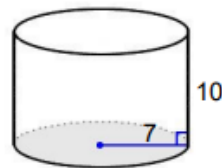
Volume: _____

7)



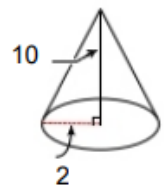
Volume: _____

8)



Volume: _____

9)



Volume: _____

Math 8th Grade Week 5

New Stuff – Calculating surface area

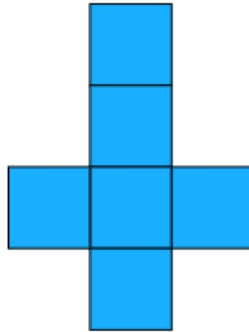
1. Definitions

Surface Area:

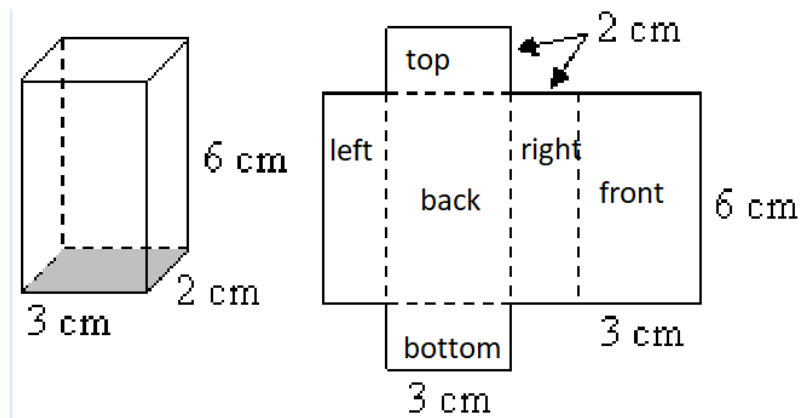


The total area of the surface of a three-dimensional object.

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 = $3\text{ cm} \times 2\text{ cm} = 6\text{ cm}^2$

Area of the bottom = area of the top = 6 cm^2

Area of the left = $2\text{ cm} \times 6\text{ cm} = 12\text{ cm}^2$

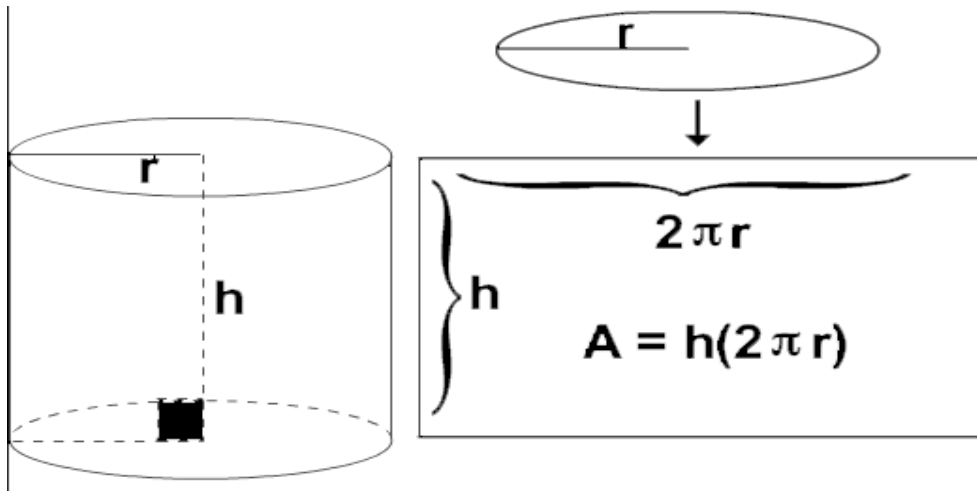
Area of the right = area of the left

Area of the front = $3\text{ cm} \times 6\text{ cm} = 18\text{ cm}^2$

Area of the back = Area of the front

$$\begin{aligned} \text{SA} &= 6\text{ cm}^2 + 6\text{ cm}^2 + 12\text{ cm}^2 + 12\text{ cm}^2 + 18\text{ cm}^2 + 18\text{ cm}^2 \\ &= 72\text{ cm}^2 \end{aligned}$$

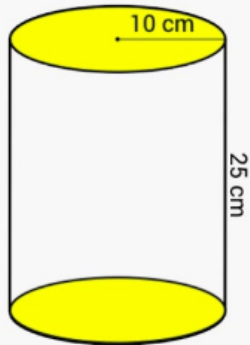
Surface Area of a cylinder



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

\uparrow \uparrow
 areas of top area of rectangle
 and bottom
 circles

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

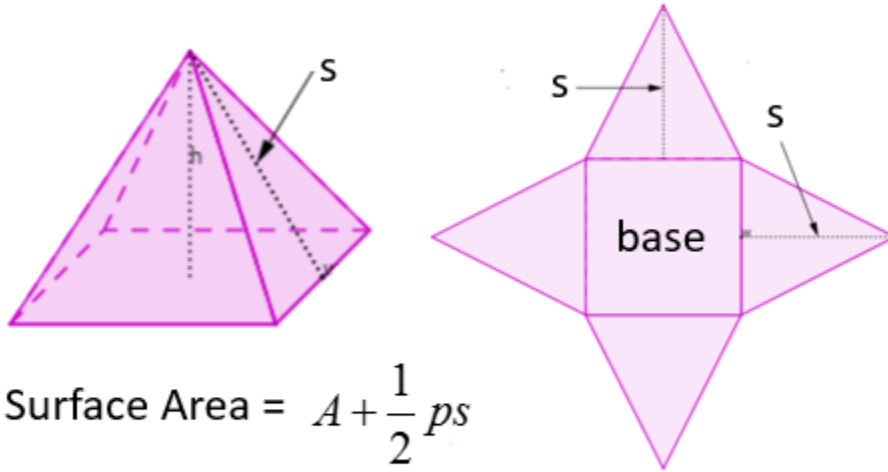


$$\begin{aligned}
 & 2\pi r^2 + 2\pi r h \\
 = & 2\pi(10)^2 + 2\pi(10)(25) \\
 = & 200\pi
 \end{aligned}$$

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

Surface area of a pyramid

Surface Area of Pyramid



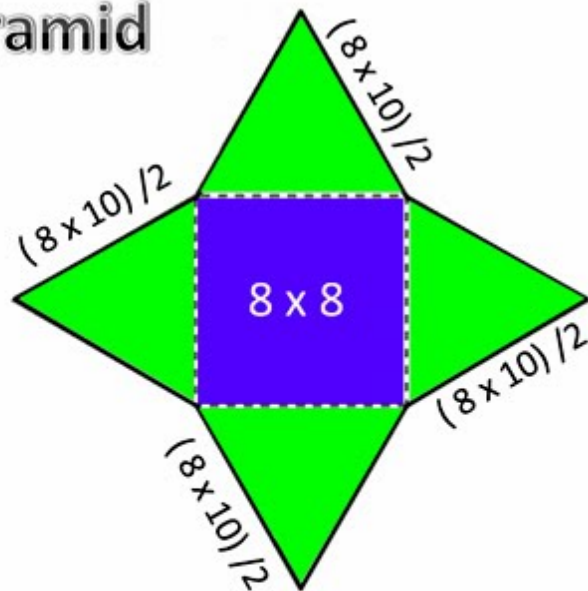
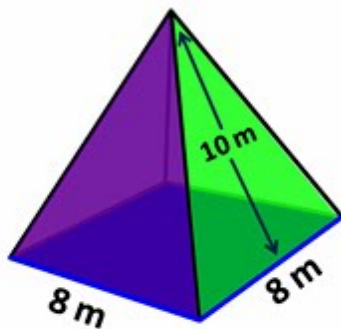
$$\text{Surface Area} = A + \frac{1}{2}ps$$

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" =

$4 \times (8 \times 10) / 2$: Four Green Triangles
 $+ 1 \times (8 \times 8)$: One Blue Purple Square

$$= 4 \times 40 + 1 \times 64 = 224 \text{ m}^2 \checkmark$$

Surface Area of a cone

Cone

Surface Area

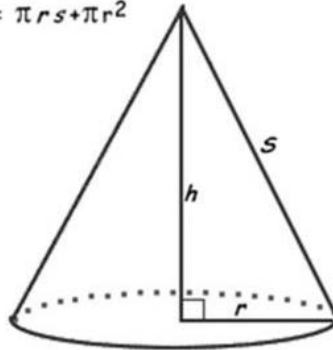
We will need to calculate the surface area of the cone and the base.

Area of the cone is $\pi r s$

Area of the base is πr^2

Therefore the Formula is:

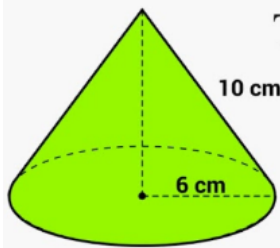
$$SA = \pi r s + \pi r^2$$



Volume

$$V = \frac{1}{3} \pi r^2 h$$

735 x 490



$$T.S.A = \pi r l + \pi r^2$$

$$\pi(6)(10) + \pi(6)^2$$

$$60\pi + 36\pi$$

$$96\pi$$

$$SA \approx 301.44 \text{ cm}$$

Videos:

Surface area of a prism

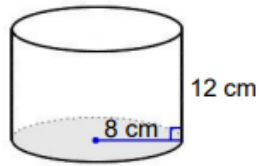
<https://www.khanacademy.org/science/ap-biology/cell-structure-and-function/cell-size/v/surface-area-of-a-box>

Volume and surface area

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

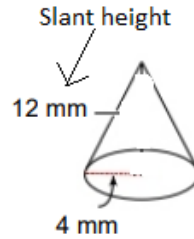
Worksheet Week 5

1)



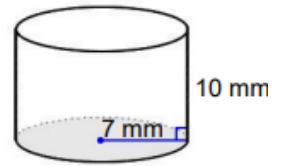
Surface Area _____

2)



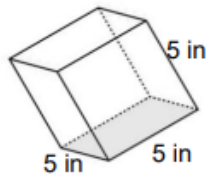
Surface Area _____

3)



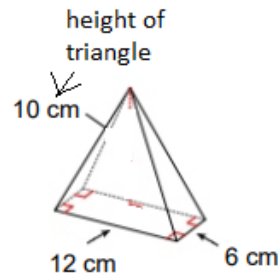
Surface Area _____

4)



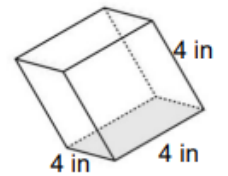
Surface Area _____

5)



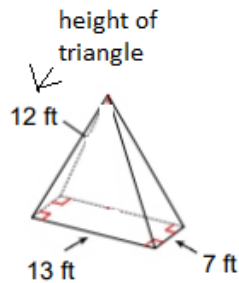
Surface Area _____

6)



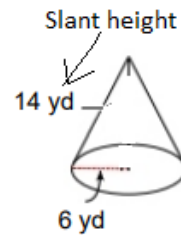
Surface Area _____

7)



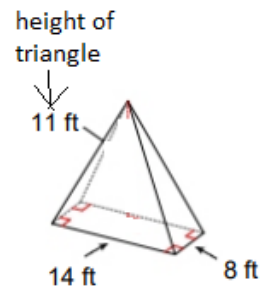
Surface Area _____

8)



Surface Area _____

9)



Surface Area _____