NOVEMBER 13, 2015

UNIT 3: SQUARE ROOTS AND SURFACE AREA

SECTION 1.3: SURFACE AREAS OF OBJECTS MADE FROM RIGHT RECTANGULAR PRISMS

M. MALTBY INGERSOLL
MATH 9

WHAT'S THE POINT OF TODAY'S LESSON?

We will continue working on the Math 9 Specific Curriculum Outcome (SCO) "Shape and Space 2" OR "SS2" which states:

SS2: "Determine the surface area of composite 3-D objects to solve problems."

What does THAT mean???

SCO SS2 means that we will stack two or more 3-D objects (right rectangular prisms, right triangular prisms, right cylinders) on top of each other. We will find the area of each face (side) of each object then add them all up to find the total surface area of the object. We will also have to subtract any overlapping sides from the total.

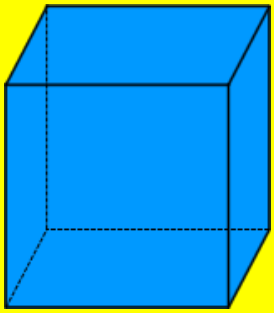
SURFACE AREA - START WHERE YOU ARE: ACTIVATING PRIOR KNOWLEDGE!

Find the surface area of this cube keeping in mind that, by definition, all sides of a cube have the same length:

$SA = 6bh$

$= 6(5)(5)$

$= 150\ cm^2$

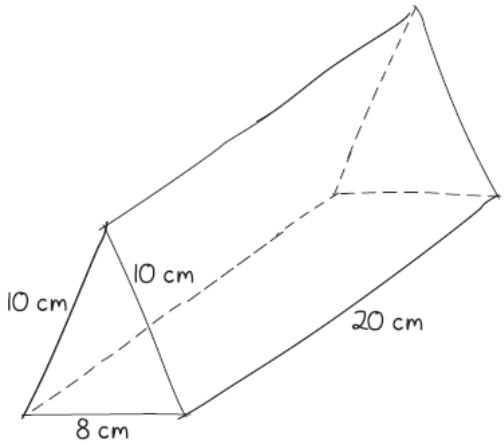


5 cm

Surface Area:
How do I begin???

I could...

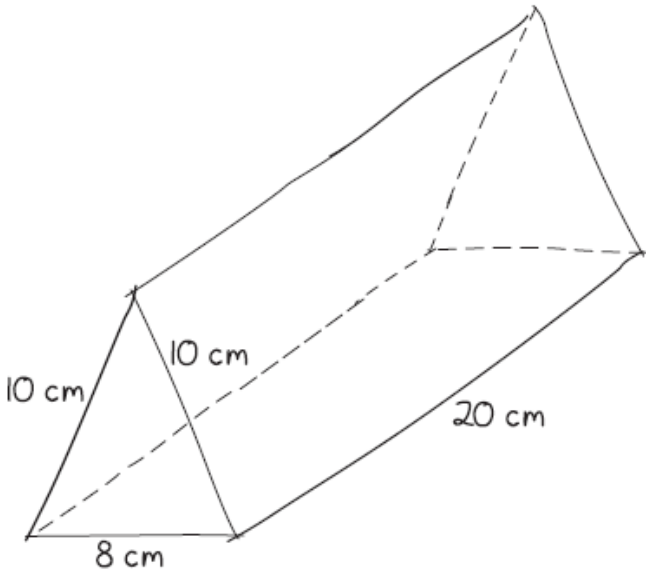
* **use a model**
* **sketch a diagram**
* **visualize the prism in my mind**



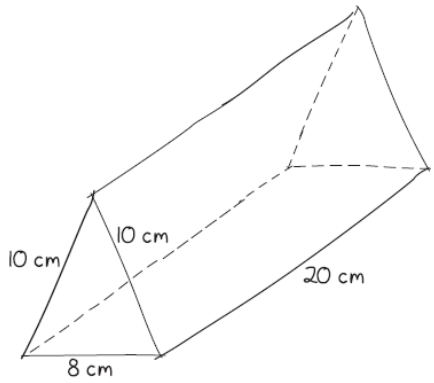
You only need to remember 5 formulas in the surface area section of this unit which you already knew before grade 9:

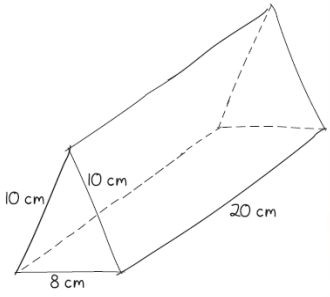
1. **Area of a rectangle/square:** bh
2. **Area of a triangle:** $\frac{bh}{2}$
3. **Area of a circle:** πr^2
4. **Circumference of a circle:** $2\pi r$ **OR** πd
5. **The Pythagorean Theorem:** $a^2 + b^2 = c^2$
6. Surface Area of a Cylinder: $2\pi r^2 + 2\pi rh$

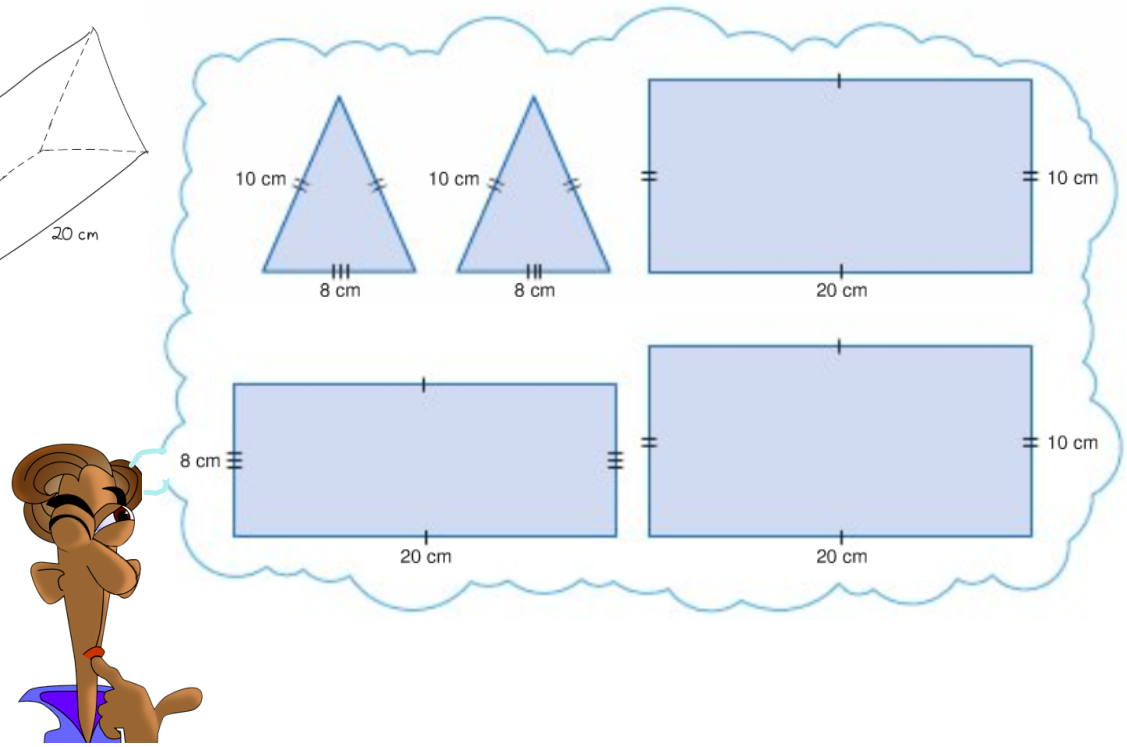
Can you visualize the faces of this triangular prism?



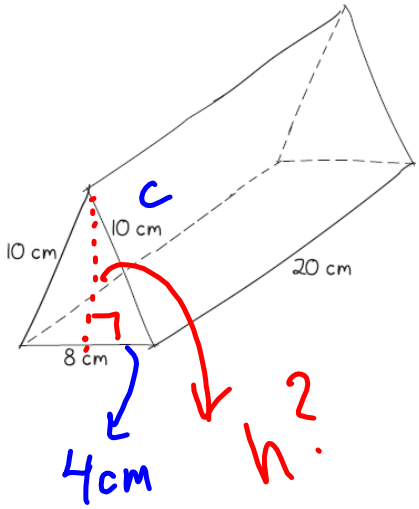
Either individually or in groups of 2, sketch the faces of this triangular prism on a sheet of loose-leaf. You will need this for our next activity.

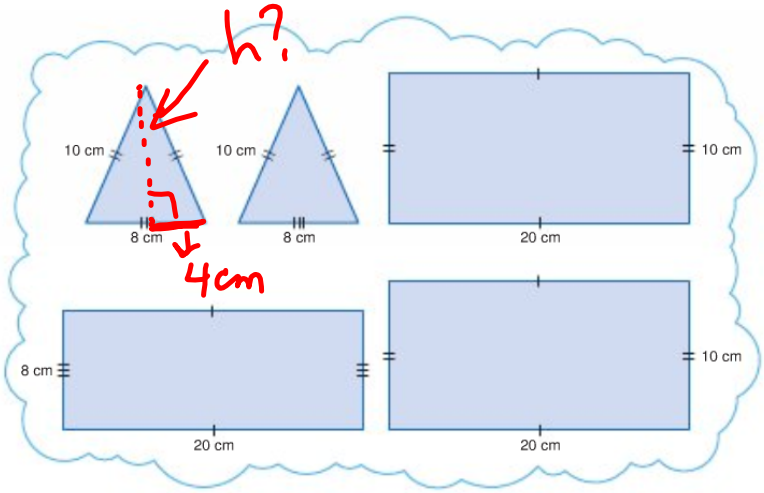



10 cm
10 cm
20 cm
8 cm


10 cm
10 cm
10 cm
8 cm
8 cm
20 cm
8 cm
10 cm
20 cm
20 cm

Using your prior knowledge of surface area and your sketches of the faces of this triangular prism, find its surface area. If you had a partner for the sketch activity, work with the same partner.





Calculations:

$a^2 + h^2 = c^2$

$4^2 + h^2 = 10^2$

$16 + h^2 = 100$

$h^2 = 100 - 16$

$\sqrt{h^2} = \sqrt{84}$

$h \doteq 9.1652\text{ cm}$

$S.A. = \cancel{2}\left(\frac{bh}{\cancel{2}}\right) + 2bh + bh$

$\doteq 8(9.1652) + 2(10)(20) + 8(20)$

$\doteq 73.3216 + 400 + 160$

$\doteq 633.3216$

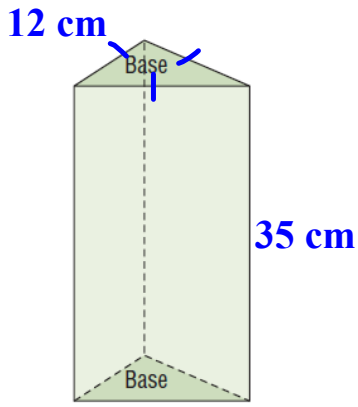
$\doteq 633.3\text{cm}^2$

HOMEWORK: Page 23 - Try "Check" #1 at the bottom of the page.

Check

1. A right triangular prism is 35 cm high. Its bases are equilateral triangles, with side lengths 12 cm. What is the surface area of the prism?

Diagram:



Calculations: