Right Prisms

Geometry

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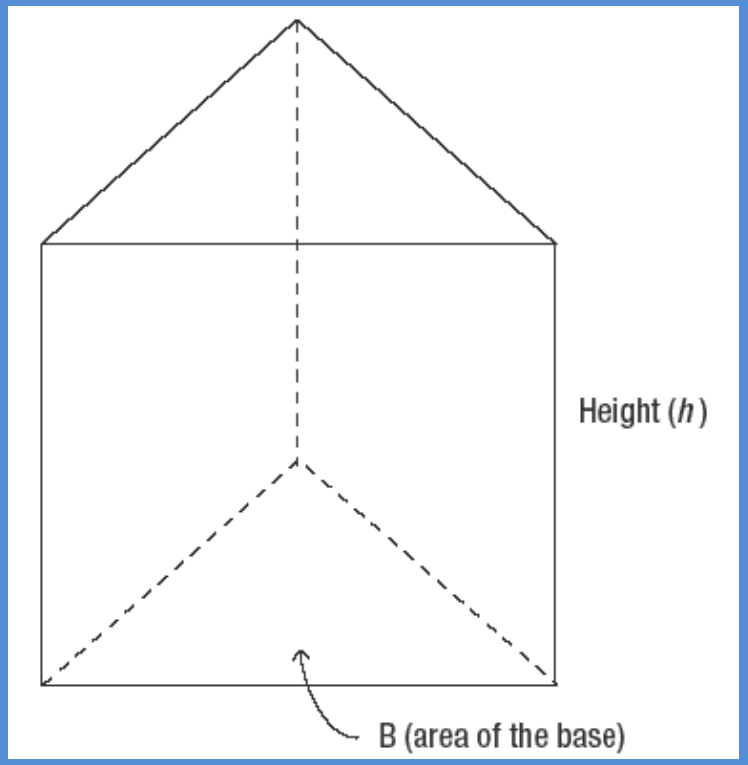
BowerPower.net

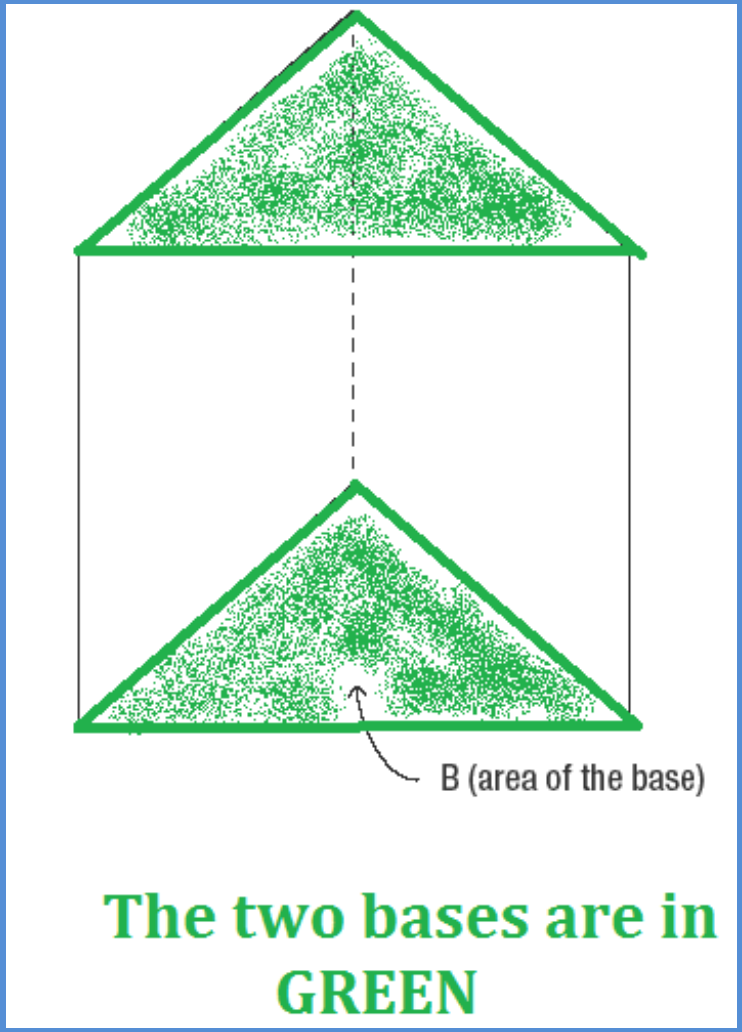
Example of a right prism

- Here is an example of a triangular right prism
  - ***Do you see the triangles at the top and the bottom?***



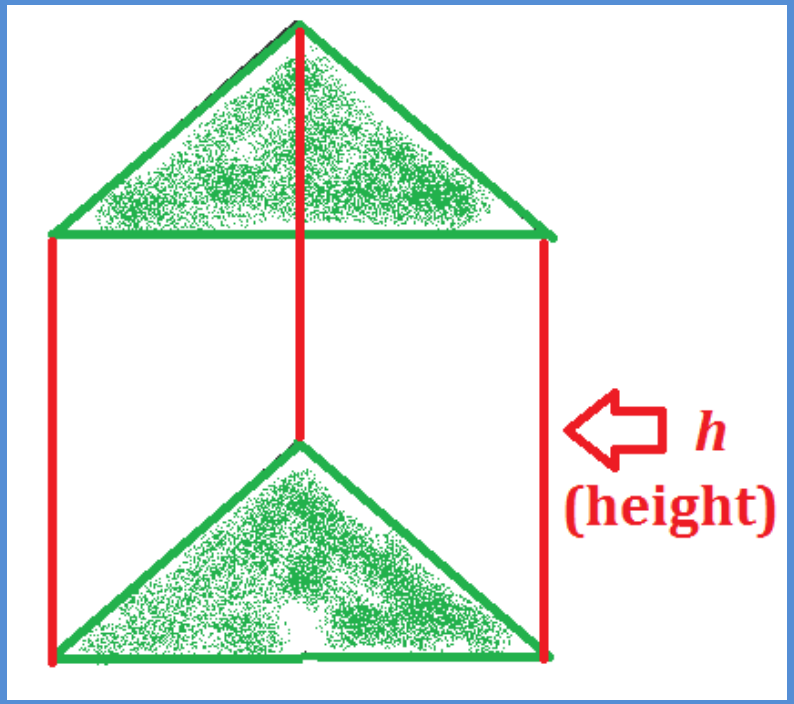
Parts of a right prism

- Bases
  - The bases are two ***congruent polygons***
  - The bases are ***parallel*** to each other
  - The ***area*** of each base is represented with a capital ***B***



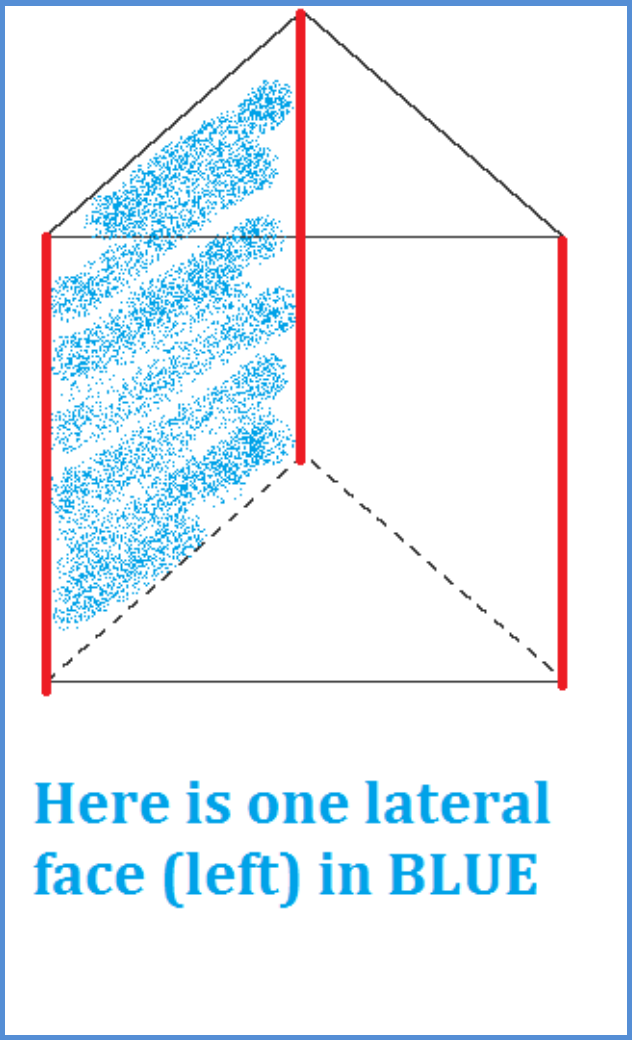
Parts of a right prism

- Height (Altitude)
  - Connects the two bases
  - ***Perpendicular*** to both bases
  - Every lateral edge is an altitude (height)
  - The height is represented with the letter ***h***



Parts of a right prism

- Lateral Faces
  - The lateral faces are ***rectangles***
  - Will be the "***walls***" if the prism is stood on one of its bases



Parts of a right prism

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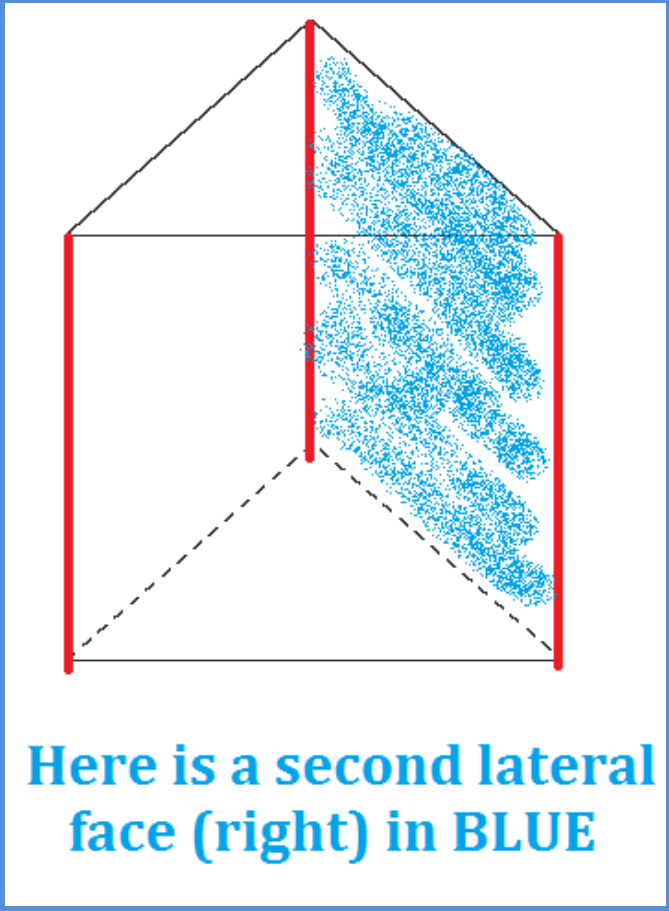
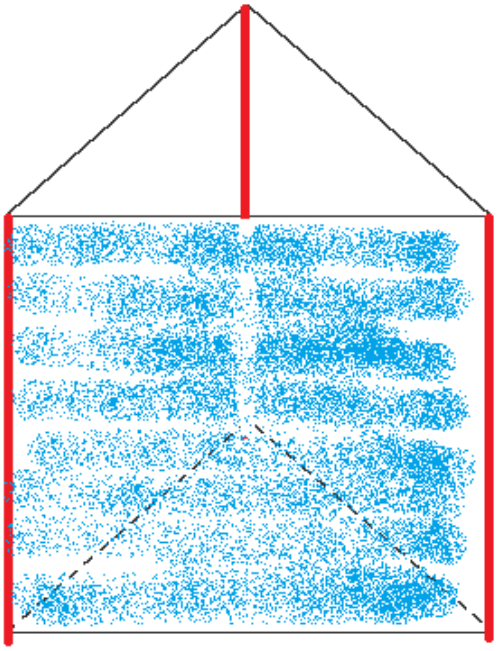


Parts of a right prism

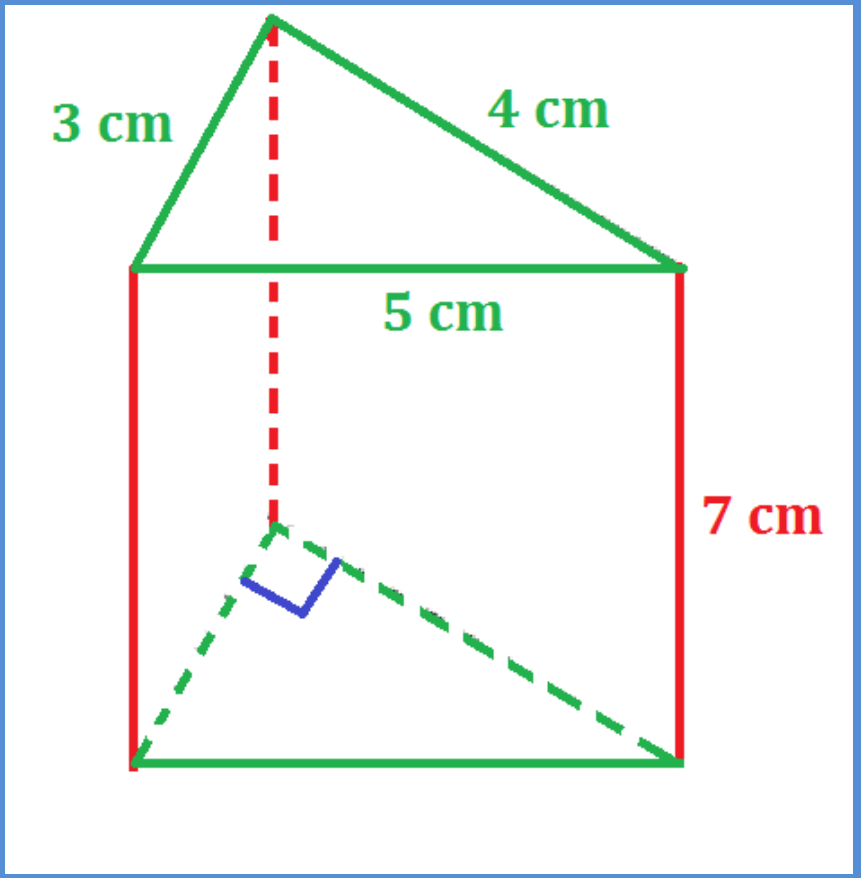
- Lateral Faces
  - The lateral faces are ***rectangles***
  - Will be the "***walls***" if the prism is stood on one of its bases



Here is a third lateral face (front) in BLUE

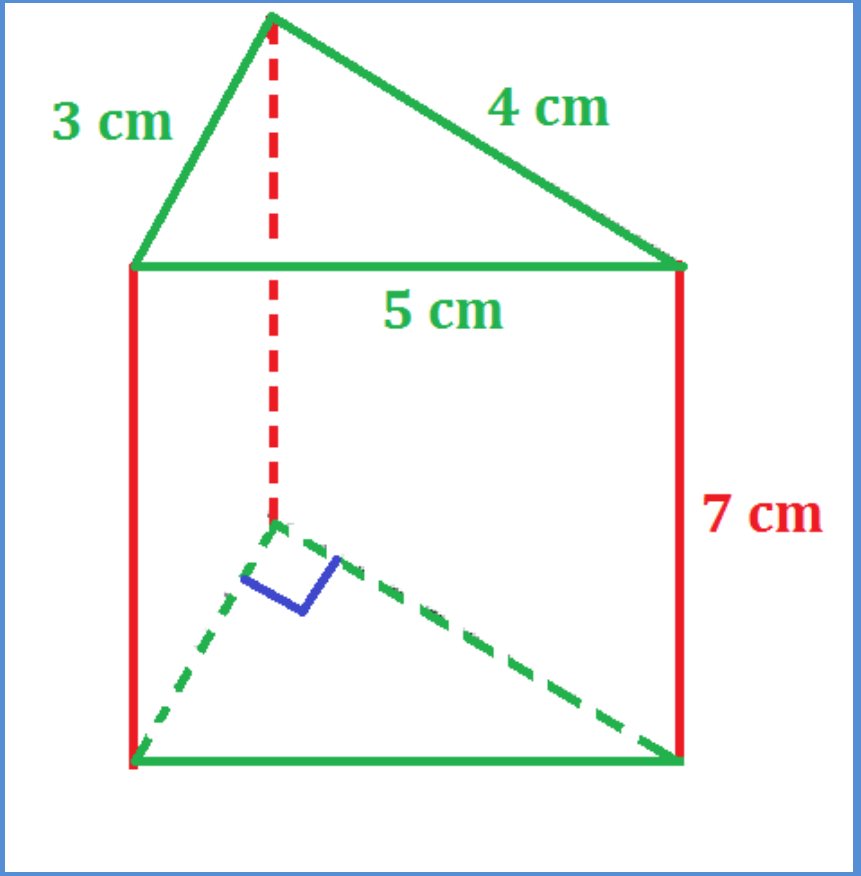
Lateral Area

- The ***lateral area*** of a prism is the sum of the area of the lateral faces (the "walls")
- It is the area covered if you paint the "walls," but not the "ceiling" or the "floor" ("ceiling" & "floor" are bases)



Lateral Area – Formula

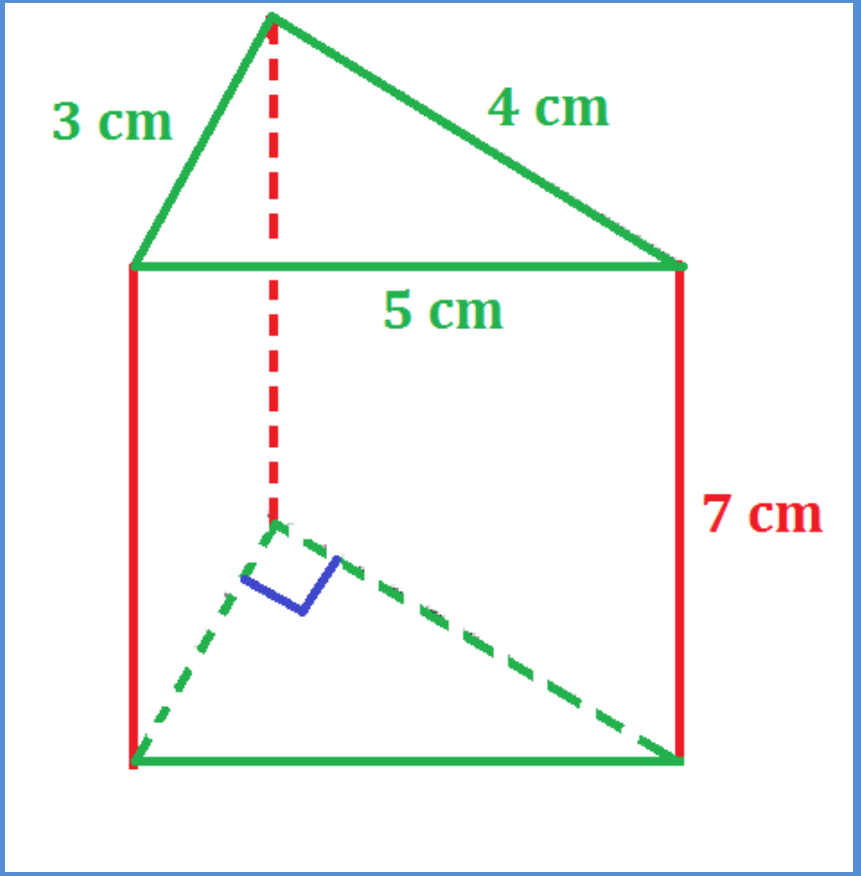
- ***L.A. = p • h***
  - ***p*** is the ***perimeter*** of a base
  - ***h*** is the ***height*** of the prism



Lateral Area – Example

- ***L.A. = p • h***

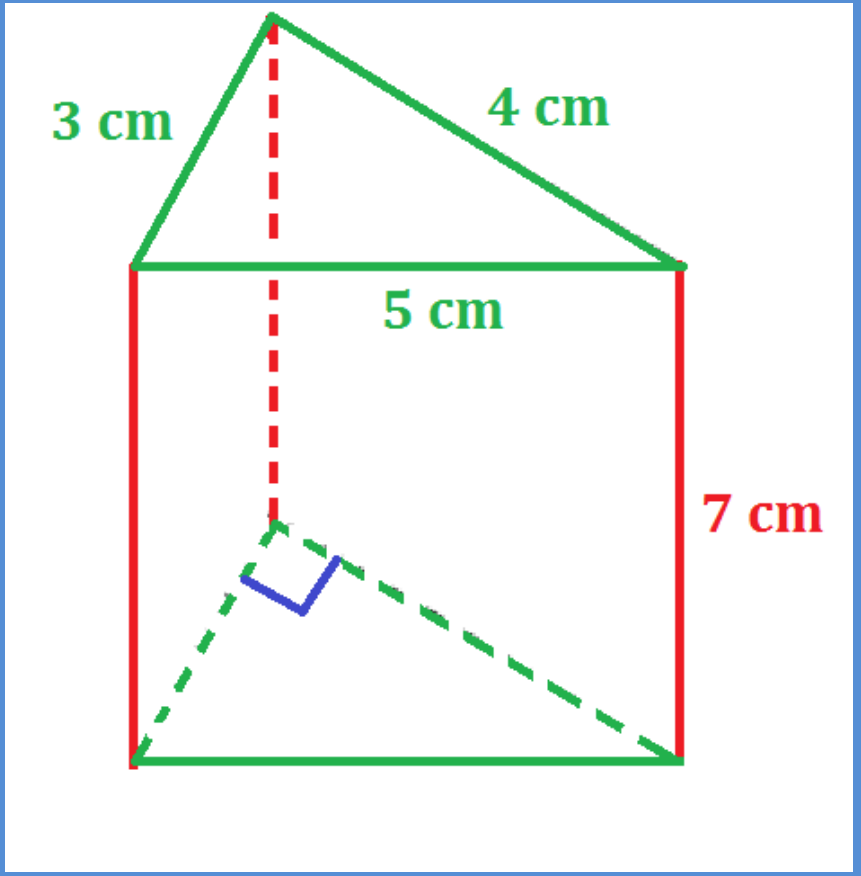
$$p = 3 + 4 + 5$$



Lateral Area – Example

- ***L.A. = p • h***

$$p = 12$$

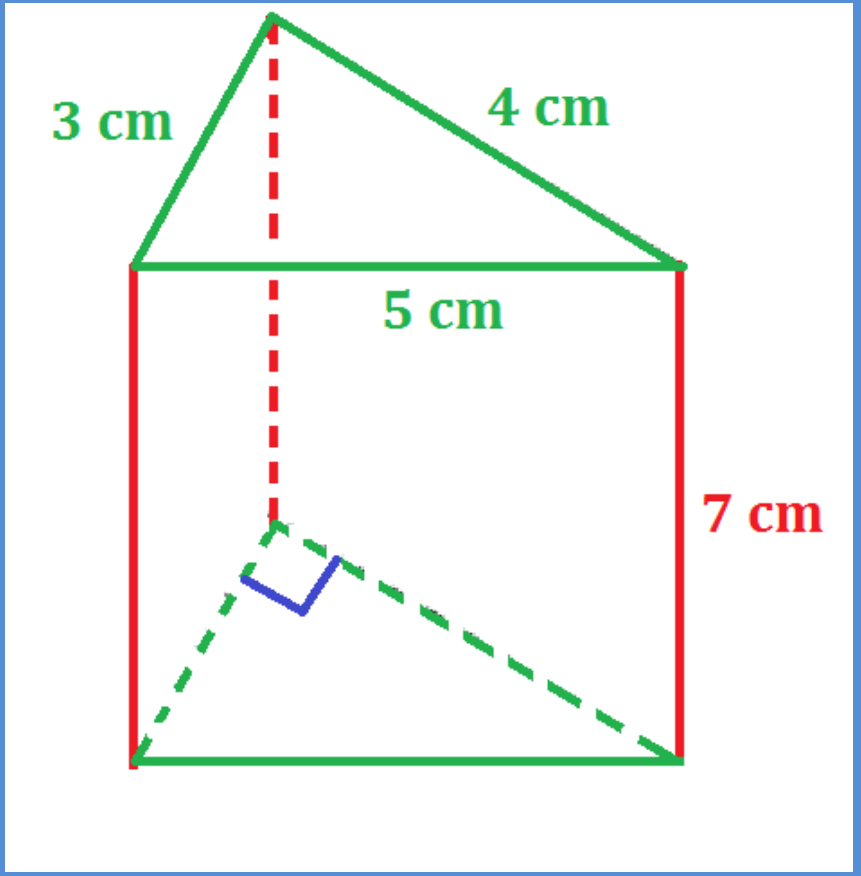


Lateral Area – Example

- ***L.A. = p • h***

$p = 12$

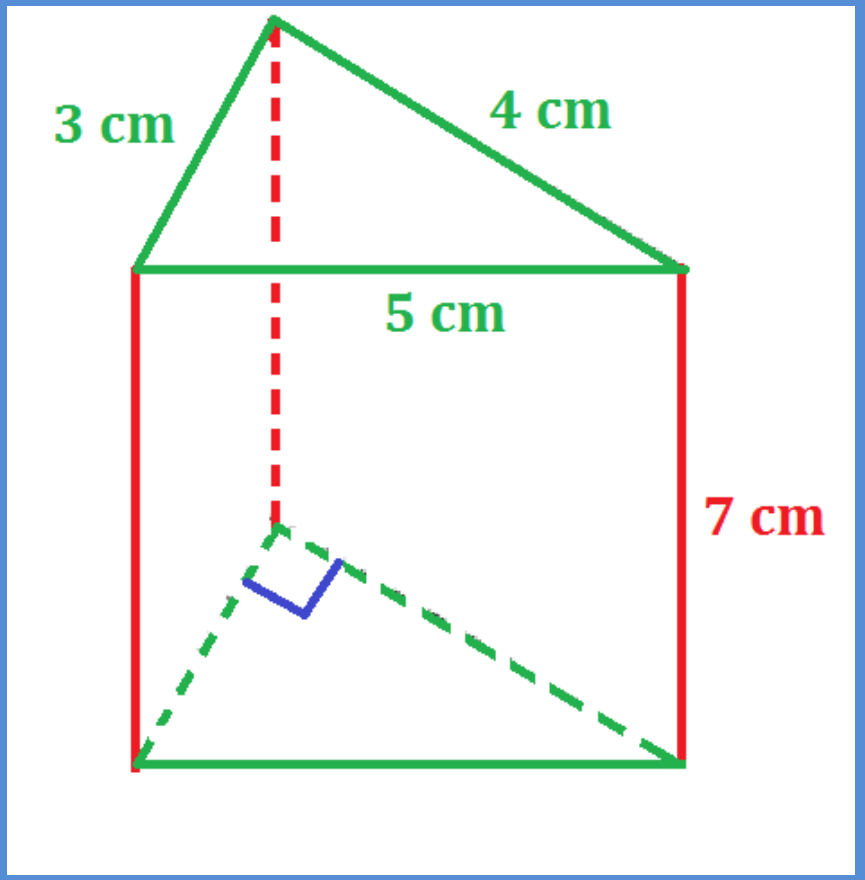
$h = 7$



Lateral Area – Example

- ***L.A. = p • h***

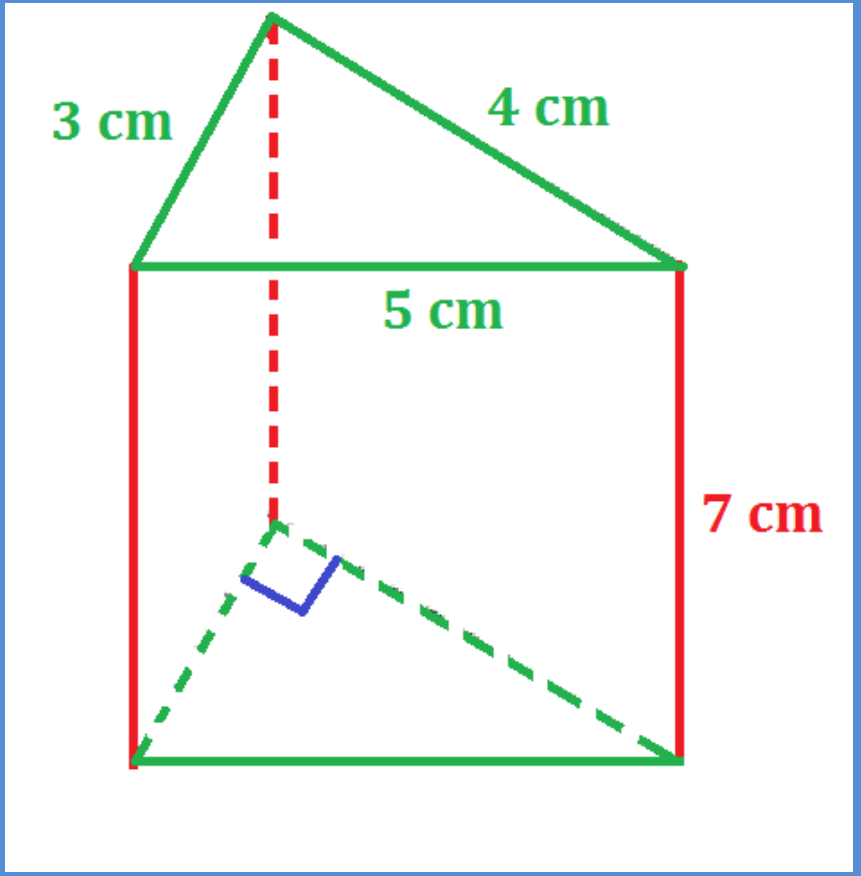
L.A. = 12 • 7



Lateral Area – Example

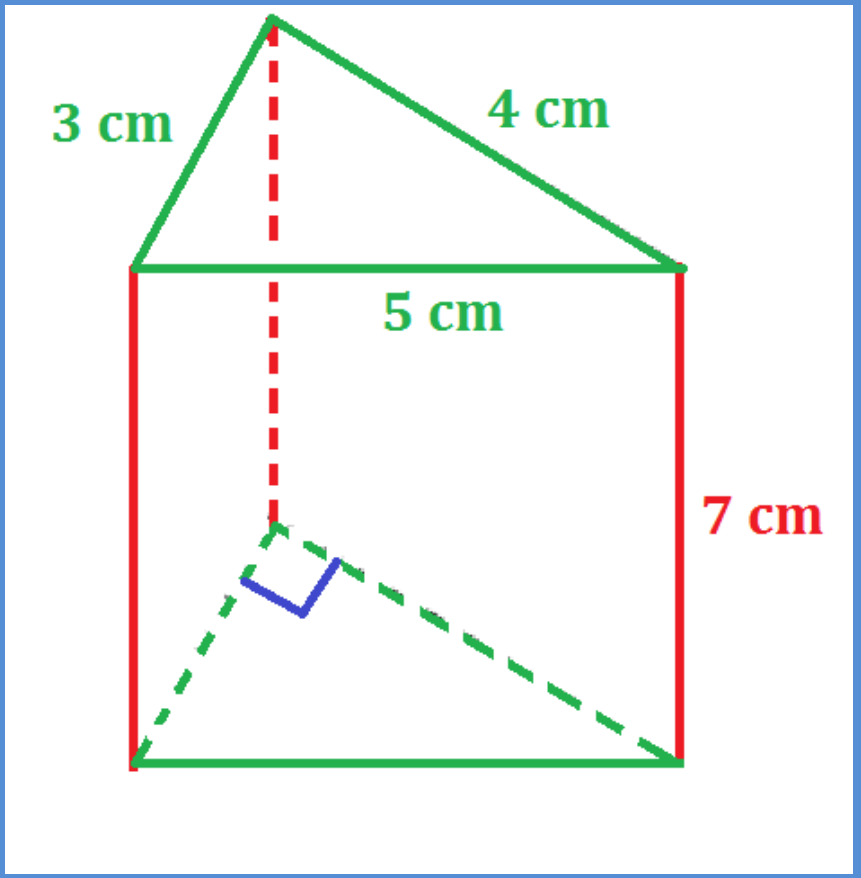
- ***L.A. = p • h***

$$L.A. = 84\ cm^2$$



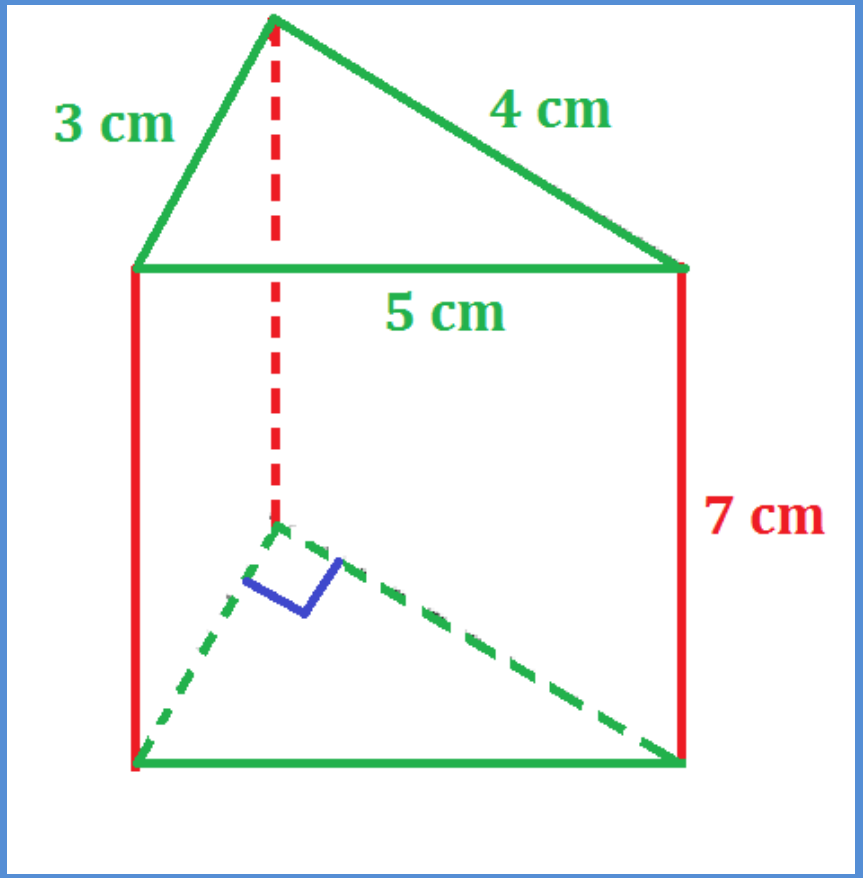
Surface Area

- The ***surface area*** of a prism is the sum of the areas of all the faces (including both bases)
- It is the area covered if you paint everything, including the ceiling and the floor



Surface Area – Formula

- ***S.A. = L.A. + 2B***
  - ***L.A.*** is the ***lateral area*** of the prism (we already know it)
  - ***B*** is the ***area*** of one base

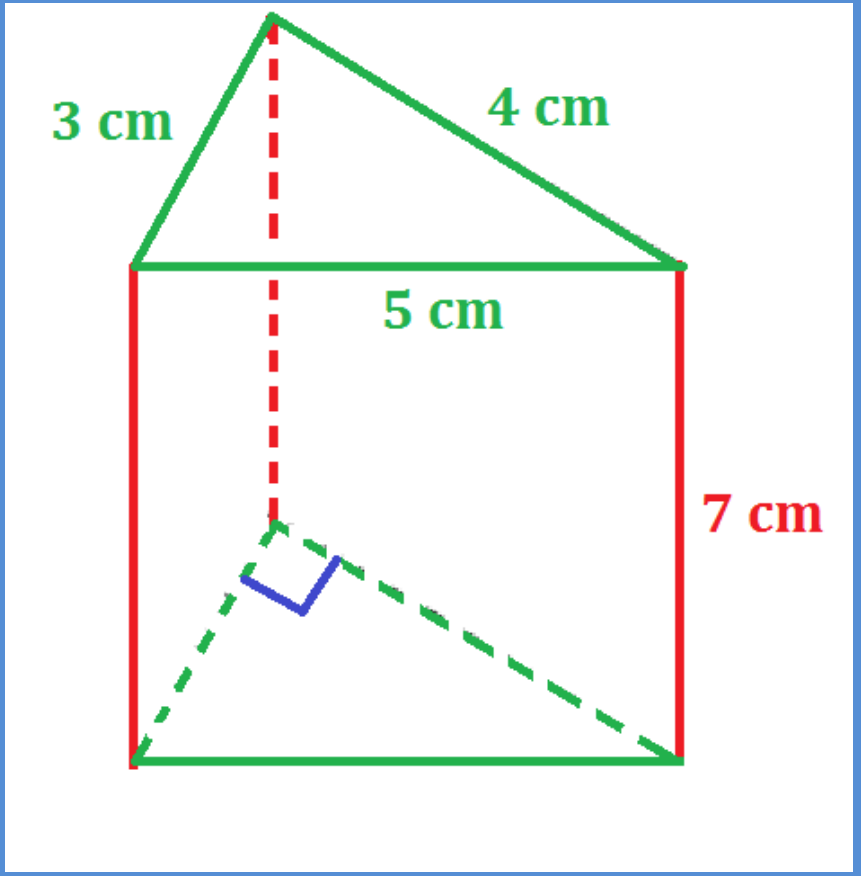


Surface Area – Example

- ***S.A. = L.A. + 2B***

S.A. = 84 + 2B

We already know the L.A. – now let's find the area of one of the bases



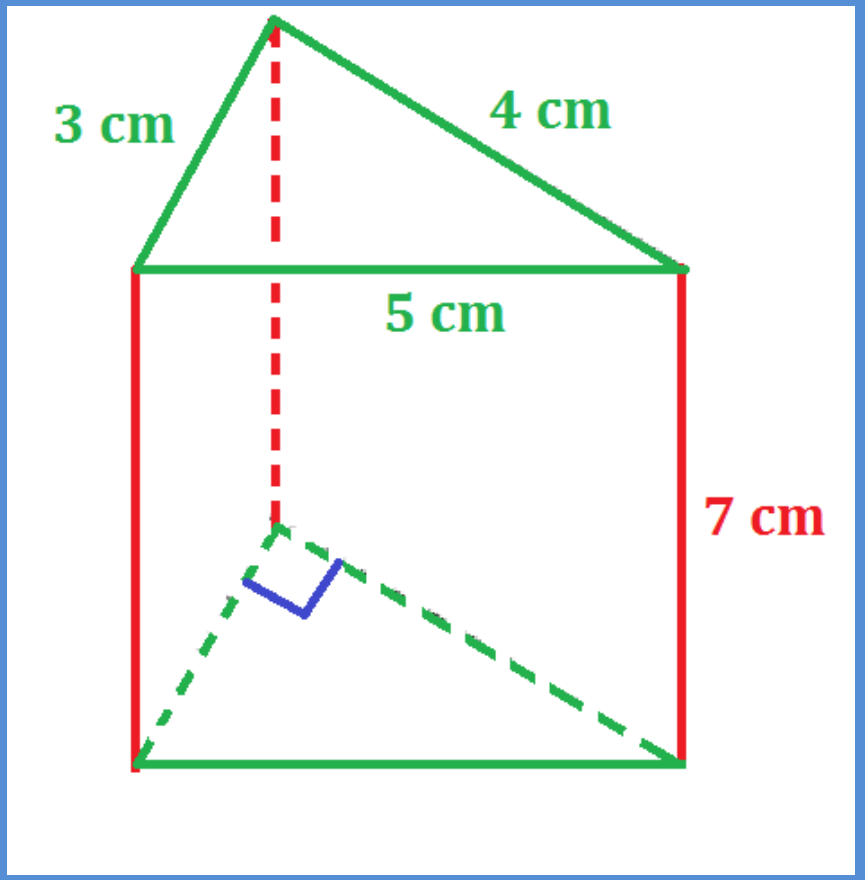
Surface Area – Example

- ***S.A. = L.A. + 2B***

S.A. = 84 + 2B

Each base is a triangle, so we'll use

B = ½ • b • h



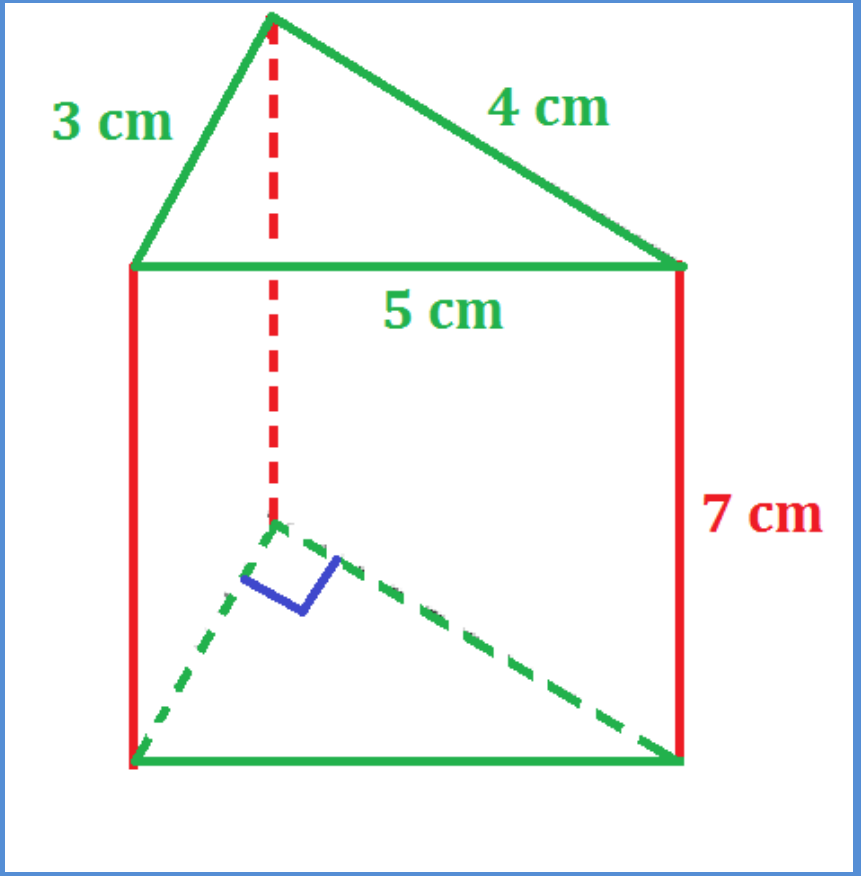
Surface Area – Example

- ***S.A. = L.A. + 2B***

S.A. = 84 + 2B

Each base is a RIGHT triangle, so

B = ½ • 3 • 4



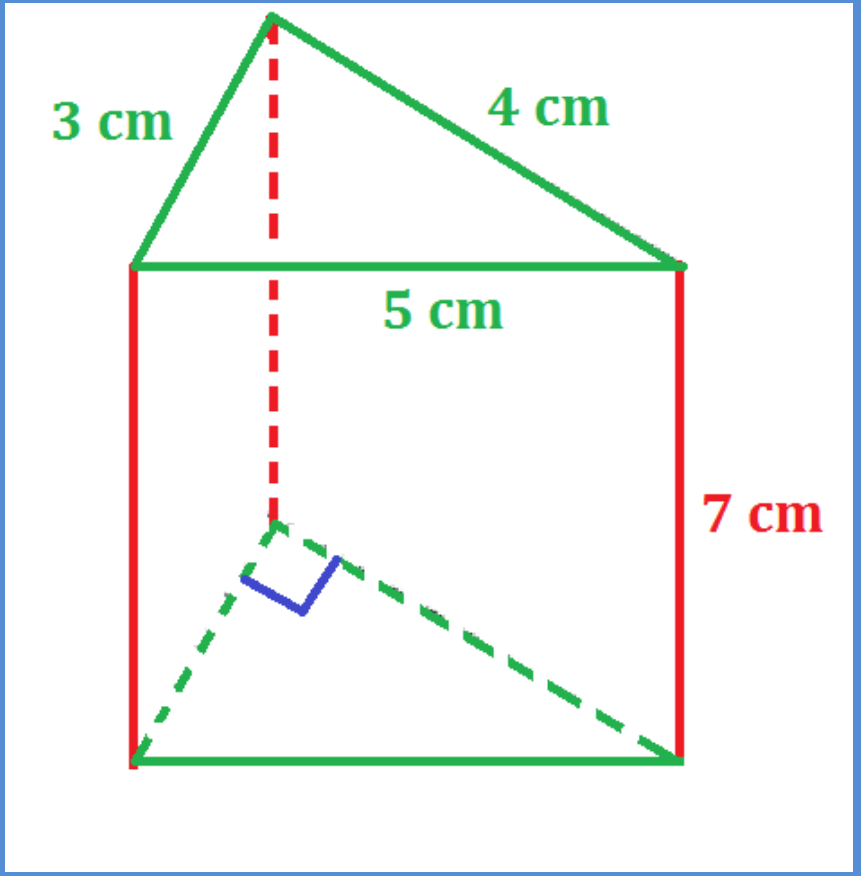
Surface Area – Example

- ***S.A. = L.A. + 2B***

S.A. = 84 + 2B

Each base is a RIGHT triangle, so

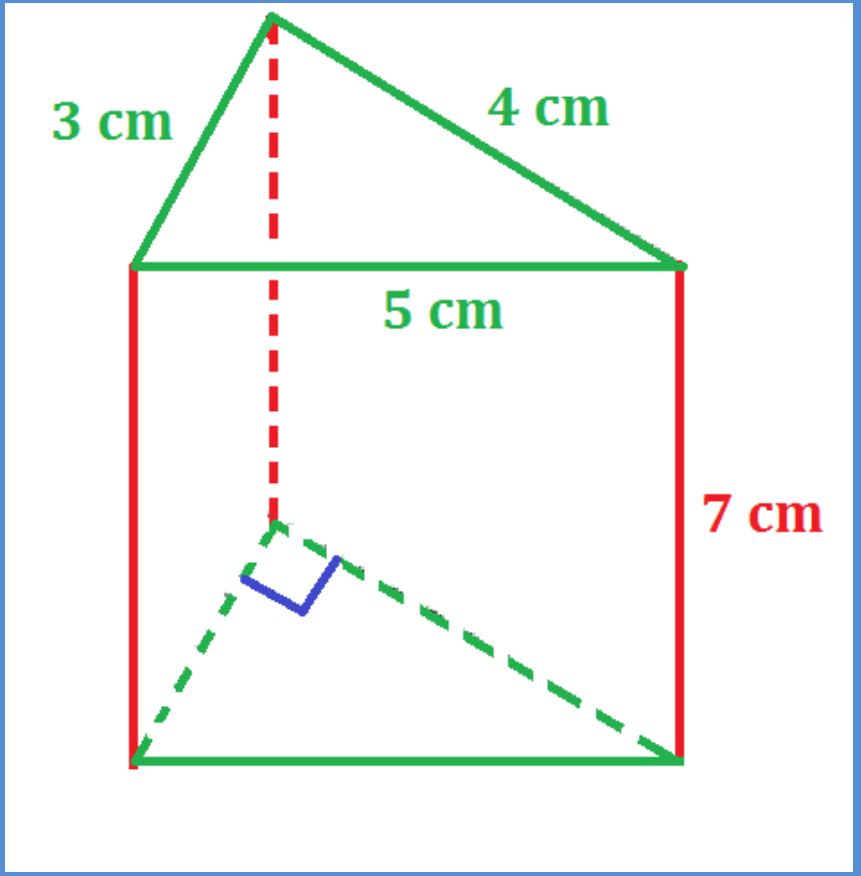
B = 6



Surface Area – Example

- ***S.A. = L.A. + 2B***

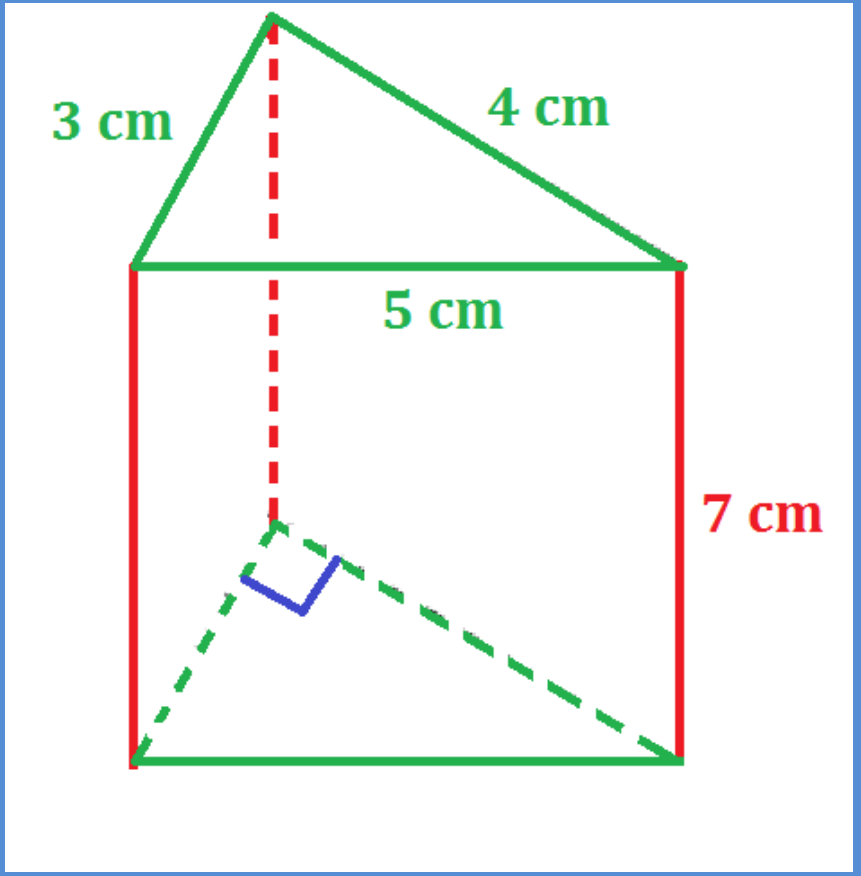
S.A. = 84 + 2(6)



Surface Area – Example

- ***S.A. = L.A. + 2B***

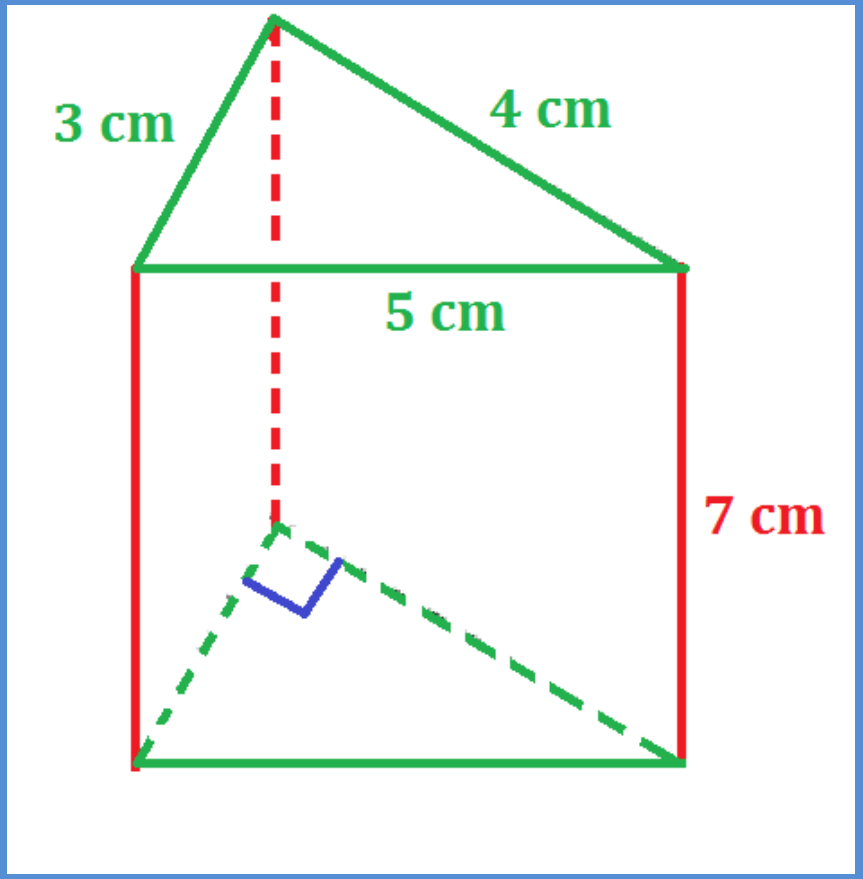
S.A. = 84 + 12



Surface Area – Example

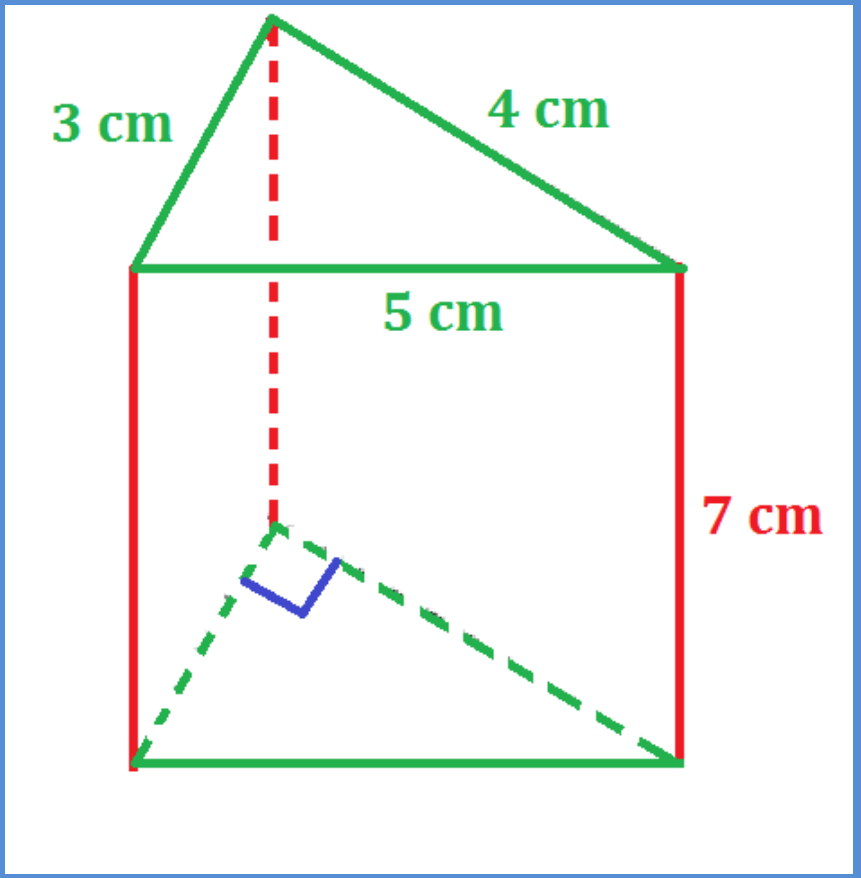
- ***S.A. = L.A. + 2B***

$S.A. = 96\ \text{cm}^2$



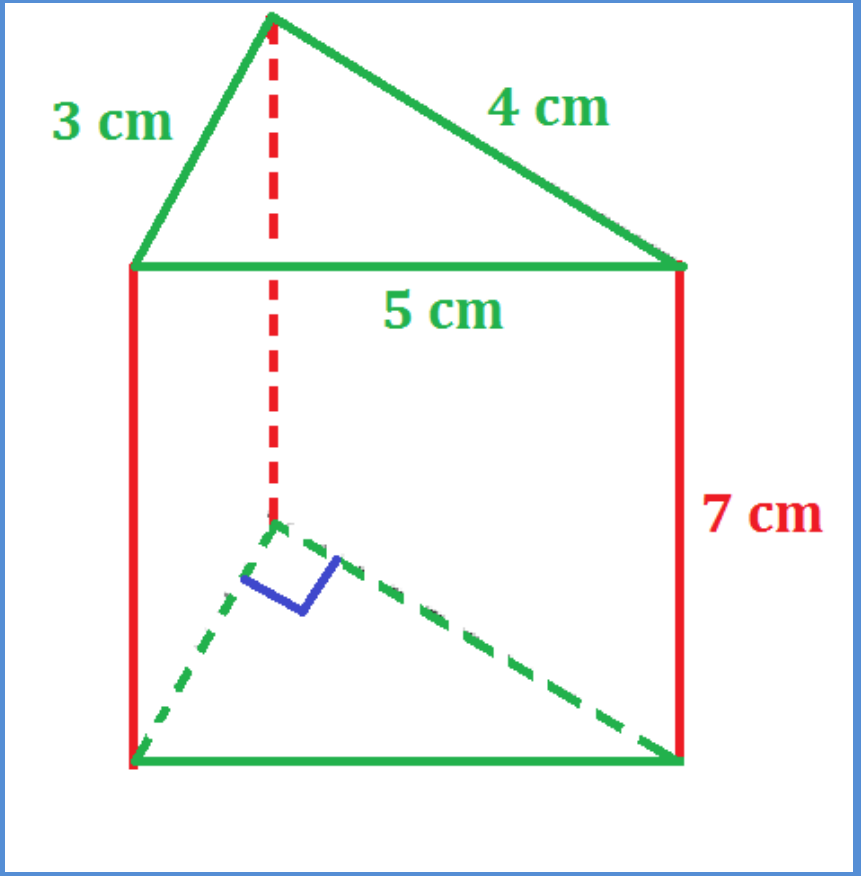
Volume

- The ***volume*** of a prism is the amount of space inside the shape
- It is the amount of liquid you could pour into the shape



Volume – Formula

- ***V = B • h***
  - ***B*** is the ***area*** of one base
  - ***h*** is the ***height*** of the prism



Volume – Example

- $V = B \bullet h$

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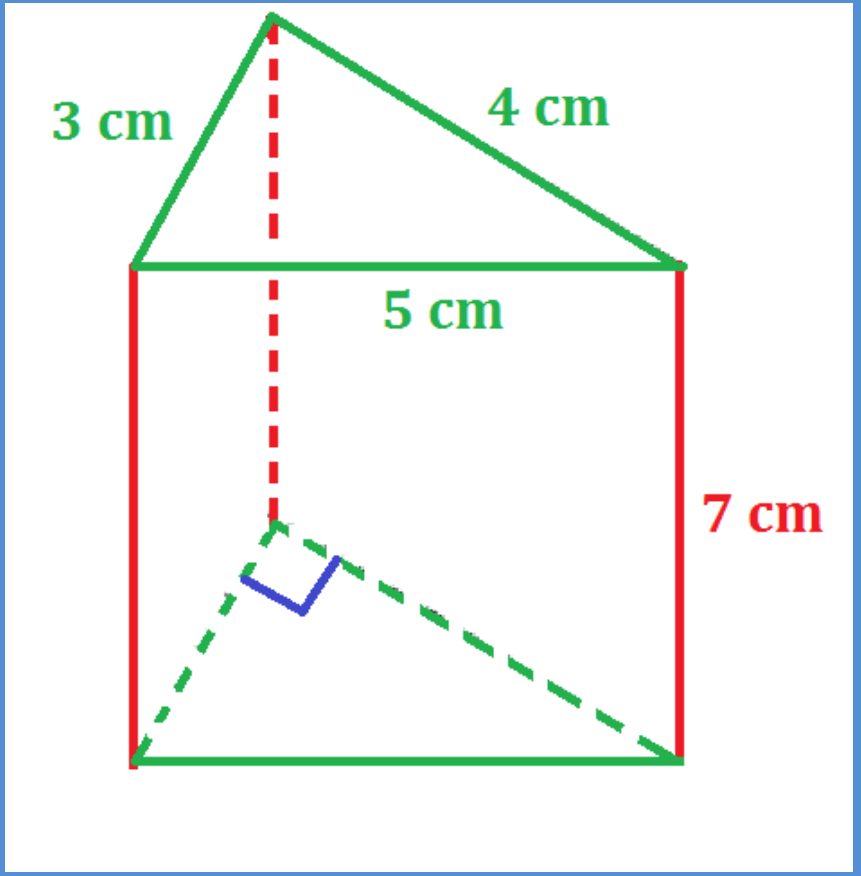
We already know both of these…

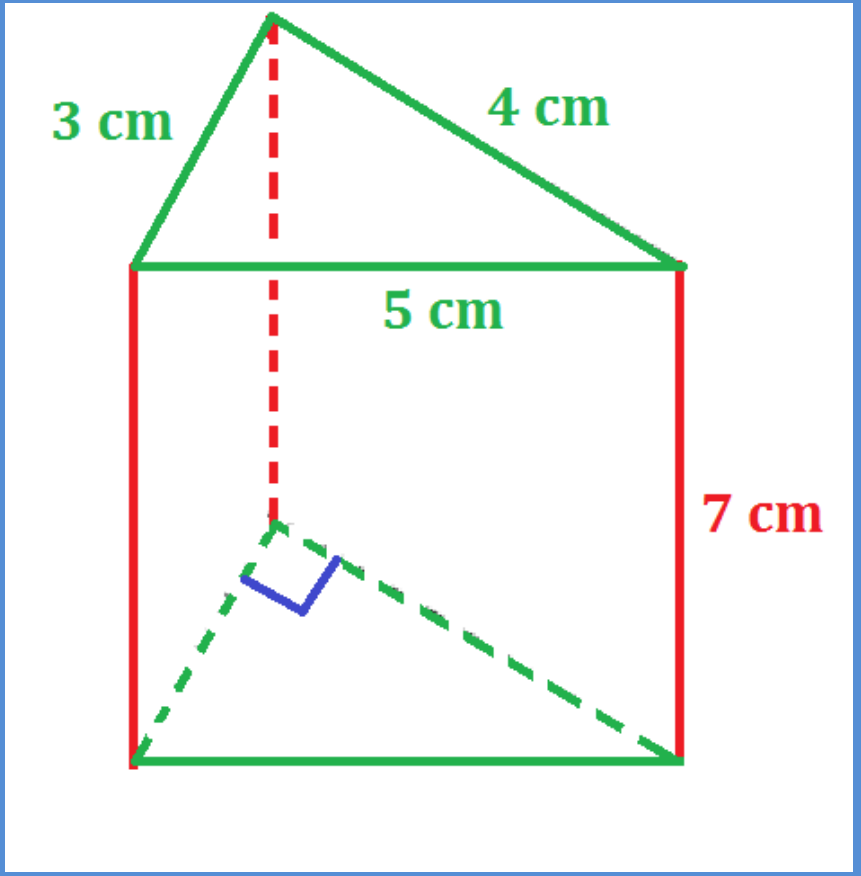
B = 6 and h = 7



Volume – Example

- $V = B \bullet h$

$V = 6 \bullet 7$

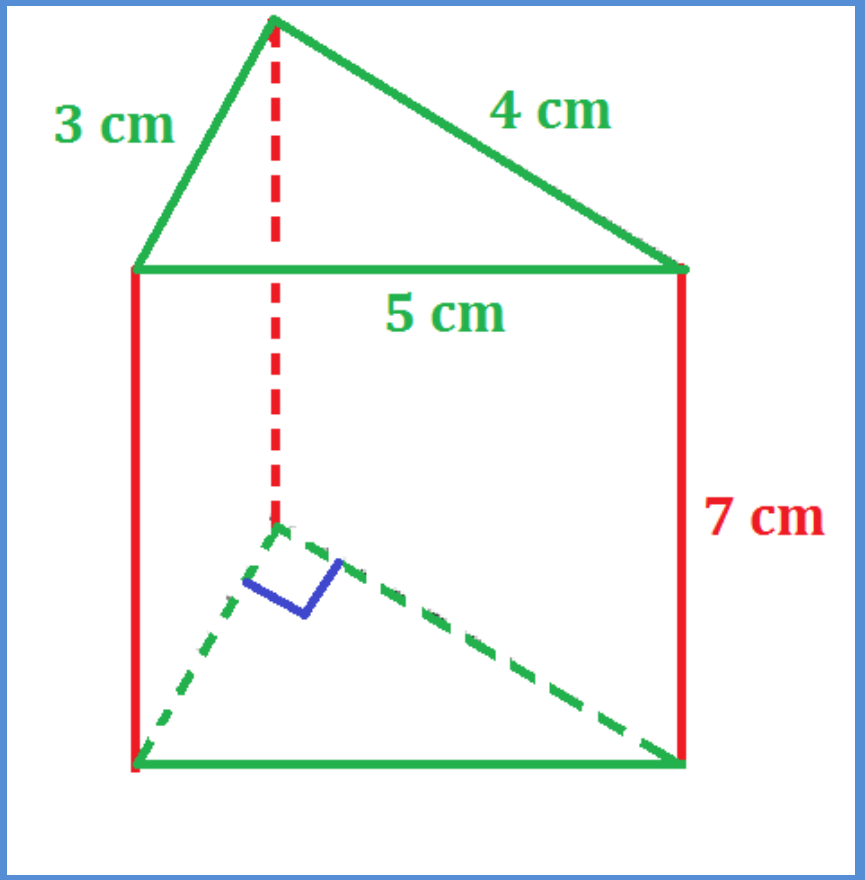


Volume – Example

- $V = B \bullet h$

$V = 42 \text{ cm}^3$

*** Notice the label of cubic centimeters



Summary of Formulas

- Lateral Area = ph
  = (perimeter of base) • height

- Surface Area = $L.A. + 2B$
  = Lateral Area + 2 • (area of base)

- Volume = Bh
  = (area of base) • height

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