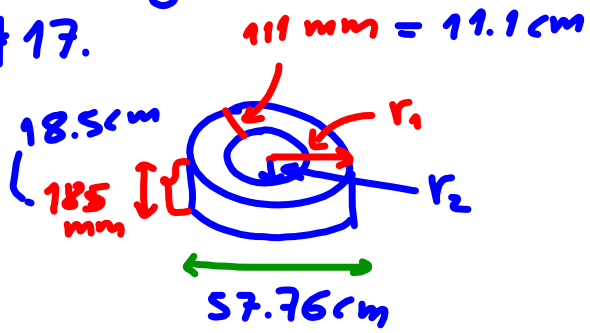
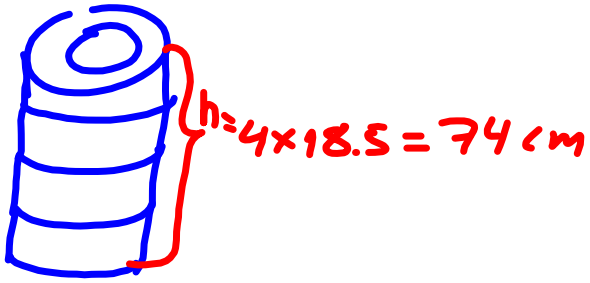
Hwk: Pg. 85:

#17.





$r_1 = \frac{57.76}{2}$

$= 28.88$ cm

$r_2 = 28.88 - 11.1$

$= 17.78$ cm

$SA = SA_{outer\text{-}cylinder} - 2A_{inner\text{-}cylinder}$

$= 2\pi r_1^2 + 2\pi r_1 h - 2\pi r_2^2$

$= 2\pi(r_1^2 + r_1 h - r_2^2)$

$= 2\pi(28.88^2 + 28.88 \times 74 - 17.78^2)$

$= 2\pi(2655.046)$

$\doteq 16682.15$

∴ The amount of shrink-wrap required is approx. $16682.15\ cm^2$.

Working with Composite 3D Objects

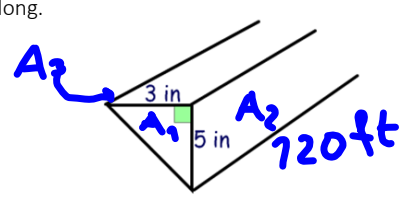
Composite Object - a structure or object made up from several simple objects.

To determine the surface area of a composite object:

- Calculate the surface area of each part of the object.
- Add the surface areas.
- Subtract the surface area of any part that were removed.

Example 1: A section of a water trough for a poultry farm is shown. The triangular face is a right triangle with a base of 3 inches and a height of 5 inches. The trough runs the length of the barn which is 120 feet long.

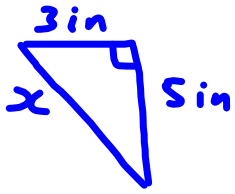
Determine the amount of sheet metal required to build the trough.



Ans: $SA_{trough} = A_1 + A_2 + A_3$

$120\text{ ft} = 120 \times 12\text{ in} = 1440\text{ in}$

$A_1 = \frac{b \times h}{2} = \frac{3 \times 5}{2} = \frac{15}{2} = 7.5\text{ in}^2$



$3^2 + 5^2 = x^2$

$9 + 25 = x^2$

$x^2 = 34$

$x = \pm\sqrt{34}$

$x \doteq \pm 5.8$

$\boxed{x \doteq 5.8\text{ in}}$

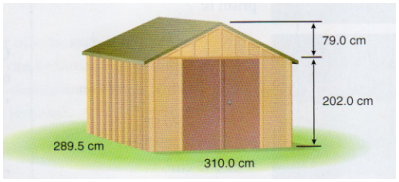
$A_2 = l \times w = 1440 \times 5 = 7200\text{ in}^2$

$A_3 = l \times x = 1440 \times 5.8 = 8352\text{ in}^2$

$SA = 7.5 + 7200 + 8352 = 15559.5\text{ in}^2$

$\therefore$ The amount of sheet metal required to build the troug is approx. 15559.5 in^2.

Example 2: Determine the surface area of the following shed, in square metres. Assume the shed has a floor that you should include in your calculations.



Ans:

$A_{roof\text{-}panels} = 2 \times 289.5 \times 174$

$= 100746 \text{ cm}^2$

$A_{roof\text{-}front} = \frac{310 \times 79}{2}$

$= 12245 \text{ cm}^2$

$A_{base\text{-}shed} = 310 \times 289.5$

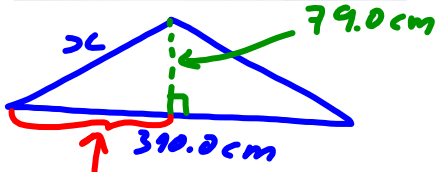
$= 89745 \text{ cm}^2$

$A_{side\text{-}shed} = 289.5 \times 202$

$= 58479 \text{ cm}^2$

$A_{front\text{-}shed} = 310 \times 202$

$= 62620 \text{ cm}^2$



$\frac{310}{2} = 155 \text{ cm}$

Use P.Th. to find x

$155^2 + 79^2 = x^2$

$x^2 = 30266$

$x = \pm\sqrt{30266}$

$x \doteq \pm 174$

$x \doteq 174 \text{ cm}$

Finally,

$SA_{Shed} = 2A_{roof\text{-}panel} + 2A_{roof\text{-}front} + A_{base\text{-}shed} + 2A_{side\text{-}shed} + 2A_{front\text{-}shed}$

$= 100746 + 2 \times 12245 + 89745 + 2 \times 58479 + 2 \times 62620$

$= 457179 \text{ cm}^2$

We know that $1 \text{ m} = 100 \text{ cm}$ or $1 \text{ cm} = 0.01 \text{ m}$

$1^2 \text{cm}^2 = 0.01^2 \text{ m}^2$

$1 \text{ cm}^2 = 0.0001 \text{ m}^2$

So, $457179 \text{ cm}^2 = 457179 \times 0.0001 \text{ m}^2$

$\doteq 45.7 \text{ m}^2$

∴ The surface area of the shed is approximately 45.7 m^2.

Hwk: Pg. 83: #12, 16, 18 & Pg. 86: #2