Area Applications

How would you define a composite figure?

- A composite figure consists of simpe figures

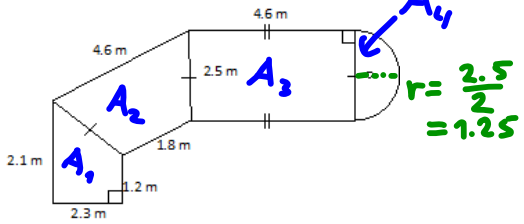
To determine the area of a composite figure:

- Break it into simpler figures for which you know how to calculate the area.
- Calculate the area of each part.
- Add the areas.
- Subtract the areas of any parts removed from the figure.

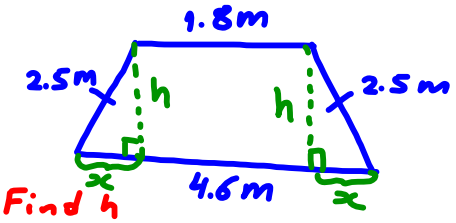
Sometimes you need to use trigonometric ratios to determine missing lengths before you can calculate the area of a composite figure.

Example: Determine the area of this miniature golf hole.

Use a white board to work with a partner to find the area. Once you are satisfied with your answer, record your solution in your notes.




$r = \frac{2.5}{2} = 1.25$




① Find h

$x = \frac{4.6 - 1.8}{2}$

$= \frac{2.8}{2}$

$= 1.4\ m$

② use P.Th. to find h


$(1.4)^2 + h^2 = (2.5)^2$

$h^2 = (2.5)^2 - (1.4)^2$

$h^2 = 4.29$

$\sqrt{h^2} = \pm\sqrt{4.29}$

$h \doteq \pm 2.1$

So, $h \doteq 2.1m$.

$A_1 = \frac{(2.1+1.2)\times 2.3}{2}$

$= \frac{3.3\times 2.3}{2}$

$\doteq 3.8\ m^2$

$A_2 = \frac{(4.6+1.8)\times 2.1}{2}$

$= \frac{6.4\times 2.1}{2}$

$\doteq 6.7\ m^2$

$A_3 = 4.6 \times 2.5$

$= 11.5\ m^2$

$A_4 = A_{\text{half-circle}}$

$= \frac{3.14\times(2.5)^2}{2}$

$\doteq 2.5\ m^2$

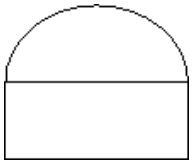
$A = A_1 + A_2 + A_3 + A_4$

$= 3.8 + 6.7 + 11.5 + 2.5$

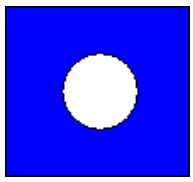
$\doteq 24.5$

∴ The area of the miniature golf hole is approx. $24.5\ m^2$

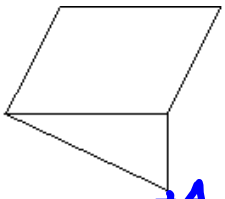
Example 2: For each of these composite figures would you add or subtract the simpler figures? What figures make up each composite figure?



$A = A_{rect} + A_{h\text{-}circle}$



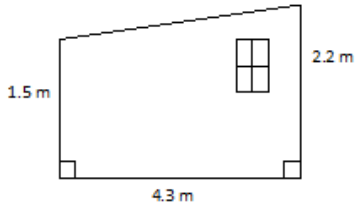
$A = A_{square} - A_{circle}$



$A = A_{parallelogram} + A_{triangle}$

Example 3 (Page 73 #9): A decorator is painting this wall of an attic room. The window measures 0.6 m by 0.5 m.

a) What is the area of the wall in square metres and square feet?




$A_{wall} = A_{trapezoid} - A_{window}$

$= \frac{(1.5+2.2)\times 4.3}{2} - (0.6\times 0.5)$

$= \frac{3.7\times 4.3}{2} - 0.3$

$\doteq 8 - 0.3$

$\doteq 7.7\ m^2$

So, the area of the wall that needs to be painted is approx. $7.7\ m^2$.

$1\ m \doteq 3.2808\ ft$

$1^2\ m^2 \doteq 3.2808^2\ ft^2$

$1\ m^2 \doteq 10.76\ ft^2$

$7.7\ m^2 \doteq 7.7\times 10.76\ ft^2$

$\doteq 82.85\ ft^2$ ← area of the wall to be painted in $ft^2$.

b) The paint is sold in 1-pint containers. Each container should cover between 50 square feet and 60 square feet. How many cans of paint should the decorator buy?

∴ We need to buy 2 cans of paint.

$1\ pint = 0.568\ L$

Hwk: Pg. 72: #5-7, 10, 12, 14