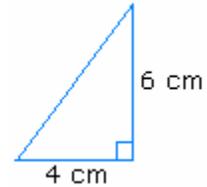


CHAPTER 8: Measurement Relationships
8.1 Apply the Pythagorean Theorem
Problem Solving Using the Pythagorean Theorem

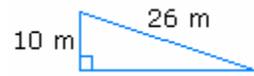
The area of a right triangle can be calculated using the formula $A = \frac{1}{2}bh$, where b and h are the lengths of the two shorter sides.

Example:

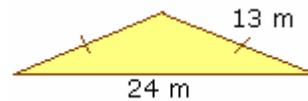
a) Find the area of the triangle shown.



b) Find the area of the triangle shown.



c) Michelle is planning to repaint the two gables of her house. One of them is shown. A can of paint covers 10 m^2 . How many cans does she need?



Solution:

$$\begin{aligned} \text{a) } A &= \frac{1}{2}bh \\ &= \frac{1}{2} \times 4 \times 6 \\ &= 12 \end{aligned}$$

The area of the triangle is 12 cm^2 .

b) Let the unknown base of the triangle be represented by b .

$$\begin{aligned}c^2 &= a^2 + b^2 \\26^2 &= 10^2 + b^2 \\676 &= 100 + b^2 \\676 - 100 &= 100 + b^2 - 100 \\576 &= b^2 \\24 &= b \\A &= \frac{1}{2}bh \\&= \frac{1}{2} \times 24 \times 10 \\&= 120\end{aligned}$$

The area of the triangle is 120 m².

c) Each gable is made up of 2 right triangles. The base of each triangle is 12 m. Let the unknown height be represented by h .

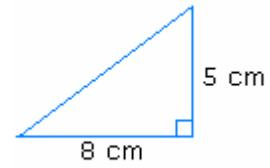
$$\begin{aligned}c^2 &= a^2 + b^2 \\13^2 &= 12^2 + h^2 \\169 &= 144 + h^2 \\169 - 144 &= 144 + h^2 - 144 \\25 &= h^2 \\5 &= h \\A &= \frac{1}{2}bh \\&= \frac{1}{2} \times 12 \times 5 \\&= 30\end{aligned}$$

The area of each triangle is 30 m². The total area to be painted is $4 \times 30 = 120$ m².

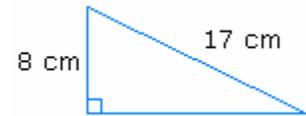
The number of cans of paint required is $\frac{120}{10} = 12$.

Practice:

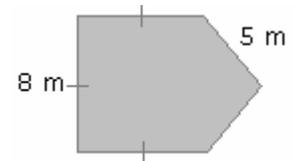
1. a) Find the area of the triangle shown.



b) Find the area of the triangle shown.



c) Adam is building a patio in the shape shown. Bricks cost \$15/m². Determine the cost of bricks for the patio.



Answers:

1. a) 20 cm² b) 60 cm² c) \$1140