

4 TAKS PREPARATION



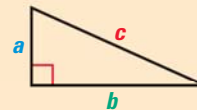
TAKS Obj. 6
TEKS G.5.D
TAKS Obj. 8
TEKS G.8.C

REVIEWING PYTHAGOREAN THEOREM PROBLEMS

To solve math problems involving the lengths of the sides of a right triangle, you need to be familiar with the following theorem.

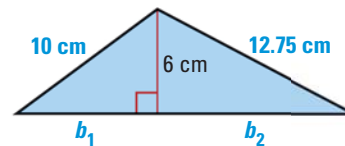
The Pythagorean Theorem

Suppose a right triangle has legs of length a and b and a hypotenuse of length c . Then $a^2 + b^2 = c^2$.



EXAMPLE

What is the area of the triangle shown?



Solution

STEP 1 Identify the information you need to find. The area A of a triangle is given by the formula $A = \frac{1}{2}bh$ where b is the base and h is the height. You know the height, 6 cm, but not the base. Notice that the base is $b_1 + b_2$.

STEP 2 Use the Pythagorean theorem to find b_1 and b_2 , which are the lengths of the legs of right triangles.

$$b_1^2 + 6^2 = 10^2$$

Pythagorean theorem

$$b_2^2 + 6^2 = (12.75)^2$$

$$b_1^2 = 10^2 - 6^2$$

Subtract 6^2 from each side.

$$b_2^2 = (12.75)^2 - 6^2$$

$$b_1 = \sqrt{10^2 - 6^2}$$

Take square root of each side.

$$b_2 = \sqrt{(12.75)^2 - 6^2}$$

$$b_1 = 8$$

Simplify.

$$b_2 = 11.25$$

STEP 3 Calculate the area of the original triangle.

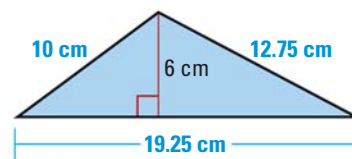
$$b_1 + b_2 = 8 + 11.25 = 19.25$$

Add b_1 and b_2 to find the base.

$$A = \frac{1}{2}bh$$

$$= \frac{1}{2}(19.25)(6)$$

$$= 57.75$$



UNDERSTAND SOLUTIONS

Note that only the positive square root is found in Step 2. This is because lengths must be positive numbers.

► The area of the triangle is 57.75 square centimeters.