

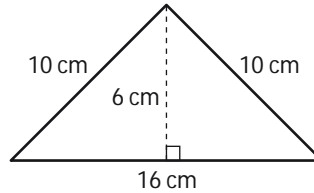
Middle School Math COURSE 3
Chapter 9, Lesson 4, More Examples

Extra Example 1
for use before Example 2

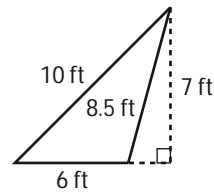
Finding the Area of a Triangle

Find the area of each triangle.

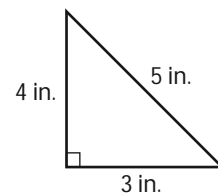
a.



b.



c.



Solution

The formula for the area of a triangle is

$$A = \frac{1}{2}bh \text{ where } b \text{ is the base of the triangle}$$

and h is the corresponding height of the triangle. In a right triangle, the base and height are the two legs of the triangle.

a. $b = 16 \text{ cm}$, $h = 6 \text{ cm}$

$$A = \frac{1}{2}bh = \frac{1}{2}(16)(6) = \frac{1}{2}(96) = 48$$

The area is 48 cm^2 .

b. $b = 6 \text{ ft}$, $h = 7 \text{ ft}$

$$A = \frac{1}{2}bh = \frac{1}{2}(6)(7) = \frac{1}{2}(42) = 21$$

The area is 21 ft^2 .

c. $b = 3 \text{ in.}$, $h = 4 \text{ in.}$

$$A = \frac{1}{2}bh = \frac{1}{2}(3)(4) = \frac{1}{2}(12) = 6$$

The area is 6 in^2 .

Extra Example 2
for use after Example 3

Using the Pythagorean Theorem

A right triangle has side lengths of 3 inches, 4 inches, and 5 inches. Find the side lengths of a triangle whose sides are half as long as those of the original triangle. Then show that the new triangle is also a right triangle.

Solution

Similar triangles have the same shape, but not necessarily the same size. Their corresponding angles are congruent. Therefore if one of the triangles is a right triangle, the other triangle must be a right triangle. You can prove this using the Pythagorean theorem.

Divide the side lengths of the original triangle by 2 to find the side lengths of the new triangle. The new triangle has side lengths of 1.5 inches, 2 inches, and 2.5 inches.

Use the converse of the Pythagorean theorem to show that the new triangle is a right triangle.

$$a^2 + b^2 \stackrel{?}{=} c^2$$

Write equation to be tested.

$$1.5^2 + 2^2 \stackrel{?}{=} 2.5^2$$

Substitute 1.5 for a , 2 for b , and 2.5 for c .

$$2.25 + 4 \stackrel{?}{=} 6.25$$

Evaluate powers.

$$6.25 = 6.25 \checkmark$$

Simplify.

ANSWER The new triangle has side lengths of 1.5 inches, 2 inches, and 2.5 inches. Because the side lengths of the triangle satisfy the equation $a^2 + b^2 = c^2$, it is also a right triangle.