

1.5 Pythagorean Theorem

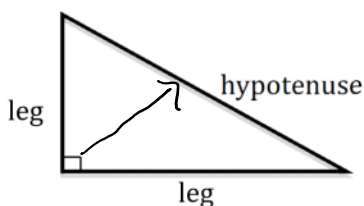
Friday, January 8, 2016 10:13 AM

Unit 1: Square Roots & The Pythagorean Theorem

Math 8

1.5 The Pythagorean Theorem

A Right triangle has two legs that form a Right angle $= 90^\circ$.
The side opposite the right angle is called the hypotenuse.



The three sides of a right triangle form a relationship known as the Pythagorean Theorem.

Pythagorean Theorem: The area of the square on the hypotenuse is equal to the area of the areas of the squares on the legs.

In the diagram:

Area of the square on the hypotenuse:

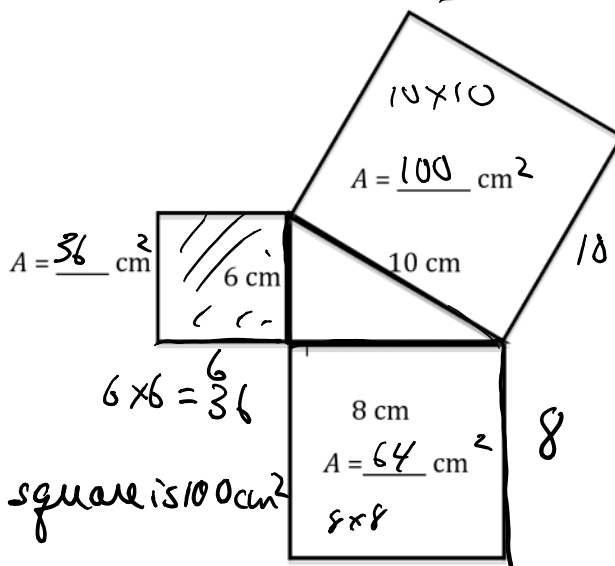
$$10^2 \text{ cm}^2 = \underline{100} \text{ cm}^2$$

Area of the squares on the legs:

$$6^2 \text{ cm}^2 + 8^2 \text{ cm}^2$$

$$= \underline{36} \text{ cm}^2 + \underline{64} \text{ cm}^2$$

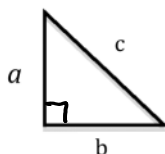
$$= \underline{100} \text{ cm}^2$$



Notice that $6^2 + 8^2 = 10^2$

The area of the big square is 100 cm^2
and
the area of the 2 smaller squares
combined is also 100 cm^2

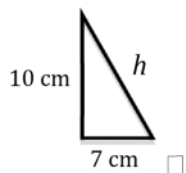
This theorem is true for all right triangles.



The Pythagorean Theorem states:

$$a^2 + b^2 = c^2$$

You can use the Pythagorean Theorem to find the length of **any** side of a right triangle when you know the lengths of the other two sides.



$$a^2 + b^2 = c^2 \text{ or } c^2 = a^2 + b^2$$

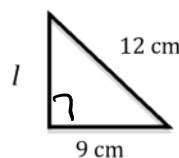
$$h^2 = 7^2 + 10^2$$

$$h^2 = 49 + 100$$

$$\sqrt{h^2} = \sqrt{149}$$

$$h = \sqrt{149}$$

$$h = 12.2 \text{ cm}$$



$$a^2 + b^2 = c^2$$

$$l^2 + 9^2 = 12^2 - 9^2$$

$$-9^2$$

$$l^2 = 12^2 - 9^2$$

$$l^2 = 144 - 81$$

$$\sqrt{l^2} = \sqrt{63}$$

$$l = \sqrt{63}$$

$$l = 7.9 \text{ cm}$$

HW:
p. 34 all.

Quest: chapter 1.1-1.4, Thursday Jan. 14

~ mostly written

~ half the class 20 → 30 minks.

→ squares, perfect squares, square roots,
finding the area/side of a square (1.3)
estimating square roots.

→ practice in your quest: Try p. 30

→ No calculators.

"mid unit review"