**Pythagoras’ Theorem**

The side opposite the right angle in a right-angled triangle is called the **hypotenuse**.

Pythagoras’ Theorem states that:

The area of the square on the hypotenuse of a right-angled triangle is equal to the sum of the areas of the squares on the other two sides.

or in symbols:

\[ a^2 + b^2 = c^2 \]

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**Examples**

1. Find \( x \)

\[ x^2 = 7^2 + 6^2 \]
\[ = 85 \]
\[ x = \sqrt{85} \approx 9.22 \text{ cm} \]  

2. Find \( x \)

\[ 5^2 + x^2 = 13^2 \]
\[ \Rightarrow x^2 = 13^2 - 5^2 \]
\[ = 169 - 25 \]
\[ = 144 \]
\[ x = 12 \text{ cm} \]
Find the area of this triangle.

\[ h^2 = 17^2 - 8^2 \]
\[ = 289 - 64 \]
\[ = 225 \]
\[ h = \sqrt{225} \]
\[ = 15 \text{ cm}. \]

Area = \( \frac{1}{2} \times 16 \times 15 \)
\[ = 120 \text{ cm}^2 \]

(4)

In \( \triangle ABC \):
- \( AB = 7 \text{ cm} \)
- \( BC = 3 \text{ cm} \)
- \( CD = 8 \text{ cm} \)
Find \( AD \).

First find \( h \):
\[ h^2 = 7^2 - 3^2 \]
\[ = 40 \]

Now find \( AC \):
\[ x^2 = 8^2 + h^2 \]
\[ = 64 + 40 \]
\[ x = \sqrt{104} \]
\[ = 10.2 \text{ cm} \quad (3 \text{ s.f.}) \]