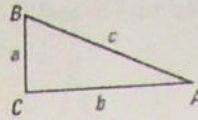# The Converse of the Pythagorean Theorem

If the square of the length of the longest side of a triangle is equal to the sum of the squares of the lengths of the other two sides, then the triangle is a right triangle.

If $c^2 = a^2 + b^2$, then $\triangle ABC$ is a right triangle.
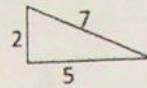
Is it Right?

Because of the Pythagorean Converse, we can check whether a triangle is a right triangle or not. Consider the following two triangles. If their side lengths make the Pythagorean Theorem true, they are right.
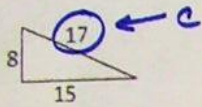
$8^2 + 15^2 \overset{?}{=} 17^2$

$64 + 225 = 289$

True, so this is a right triangle.

$2^2 + 5^2 \overset{?}{=} 7^2$

$4 + 25 \neq 49$

False, $4 + 25$ is not 49, so it is not a right triangle.

Examples

Determine if the following triangles are right triangles or not. You must justify your answer. *Diagrams are not drawn to scale.*
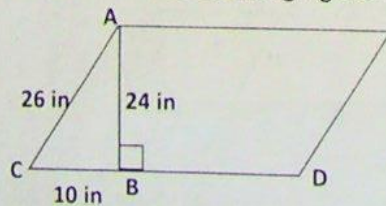
Biggest ↓ (c)

1) 10   26   24

$10^2 + 24^2 \overset{?}{=} 26^2$

$100 + 576 = 676$

$676 = 676$

$\boxed{Yes}$

2) 8   4   6

$4^2 + 6^2 \overset{?}{=} 8^2$

$16 + 36 = 8^2$

$52 \neq 64$

$\boxed{No}$

3) a = 5 cm
    b = 12 cm
    c = 13 cm

$5^2 + 12^2 \overset{?}{=} 13^2$

$25 + 144 = 169$

$\boxed{Yes}$

4) 5 m, 2 m, 3 m

$2^2 + 3^2 \overset{?}{=} 5^2$

$4 + 9 \neq 25$

$\boxed{No}$

5) Determine if $\overline{AB} \perp \overline{CD}$ in the following figure.

26 in   24 in   10 in

$10^2 + 24^2 = 26^2$

$100 + 576 = 676$

(Yes) No