UNIT 6: IRRATIONAL MATH

Objectives: I can apply the Converse of the Pythagorean Theorem to determine if three side lengths form a right triangle.

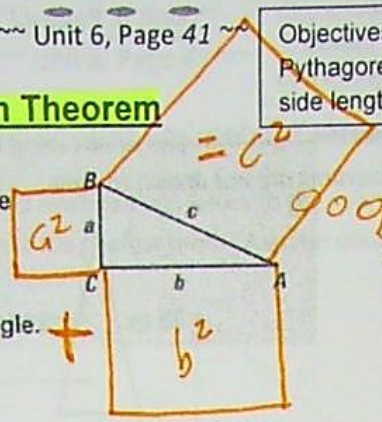
$a^2+b^2=c^2$

The Converse of the Pythagorean Theorem

(reverse)

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.

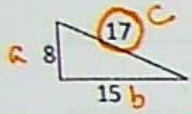
If $c^2 = a^2 + b^2$, then $\triangle ABC$ is a right triangle.



oops! sloppy SQUARE

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.



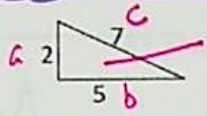
$8^2 + 15^2 \stackrel{?}{=} 17^2$

$64 + 225 = 289$

$289 = 289$

True, so this is a right triangle.

Yes!



impossible! LOOK

2 5 7

won't even make a triangle!

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

$4 + 25 \neq 49$

$29 \neq 49$

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

No!

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

Examples

Determine if the following triangles are right triangles or not. You must justify your answer. Diagrams are not drawn to scale.

1) a = 10, 26 = c, b = 24

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

$676 = 100+576$

$676 = 676$

Yes!

2) 8 = c, a = 4, b = 6

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

$64 = 16+36$

$64 \neq 52$

No!

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

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

$169 = 25+144$

$169 = 169$

Yes!

4) 5 m, 2 m, 3 m

2m 3m 5m

impossible!

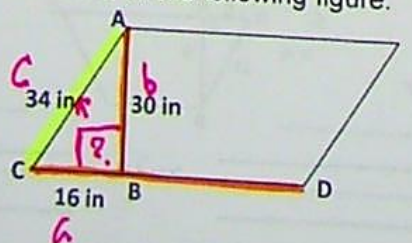
$5^2 \stackrel{?}{=} 2^2+3^2$

$25 = 4+9$

$25 \neq 13$

No!

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



$34^2 = 16^2+30^2$

$1156 = 256+900$

$1156 = 1156$

True

Yes / No