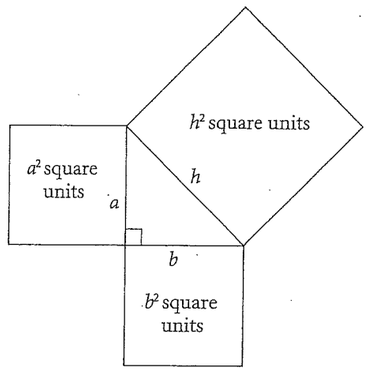
1.7 Applying the Pythagorean Theorem

Quick Review

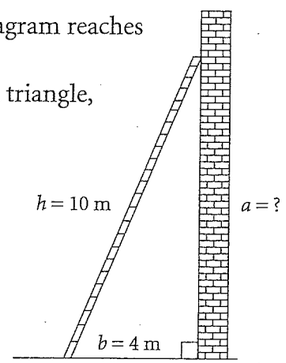
At Home / At School

- The Pythagorean Theorem applies to right triangles.
- An algebraic equation for the Pythagorean Theorem is $h^2 = a^2 + b^2$, where h is the length of the hypotenuse and a and b are the lengths of the legs.



- You can apply the Pythagorean Theorem to problems involving right triangles.

You can calculate how high up the wall the ladder in the diagram reaches using the formula $h^2 = a^2 + b^2$
Since the length of the ladder is the hypotenuse of the right triangle, we label it h. The lengths of the two legs of this triangle are labelled a and b.



Substitute $b = 4$ and $h = 10$ into $h^2 = a^2 + b^2$

$10^2 = a^2 + 4^2$
$100 = a^2 + 16$
$100 - 16 = a^2 + 16 - 16$
$84 = a^2$
$\sqrt{84} = a$
$9.2 \doteq a$

a is approximately 9.2 m. The ladder reaches approximately 9.2 m up the wall.

Tip

*It does not matter which leg is labelled a and which leg is labelled b, so long as a and b label the **legs** and h labels the **hypotenuse**.*

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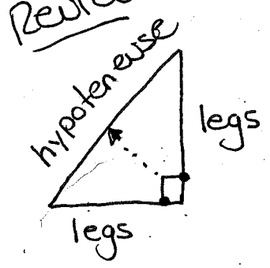
Review



$$\boxed{\underbrace{A^2 + B^2}_{\text{legs}} = \underbrace{C^2}_{\text{hypotenuse}}}$$

Pythagorean Theorum
- used to calculate the side length of right Δ (only)
- used to check if a Δ is a right Δ

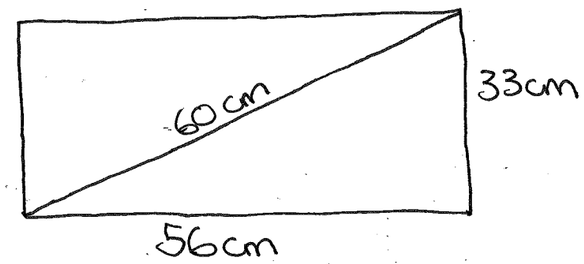
New

Word Problems

1) Find the question - usually the last sentence
   - has a ? after it
2) Look for the math words
   add: plus, more, greater, sum...
   subtract: minus, less, fewer, difference...
   multiply: groups, times, groups of...
   divide: divided into, split, shared....
3) Draw a Picture
4) Solve the problem and answer the question.

Ex 1 Maria helped her dad build a small rectangular table for her bedroom. The tabletop has a length of 56cm and a width of 33cm. The diagonal measures 60cm. Does the table have square corners?

1) Find question : square corners y/n
2) math words - none
* 3) Draw a picture
4) Solve and Answer
   - label a, b, c



33, 56, 60

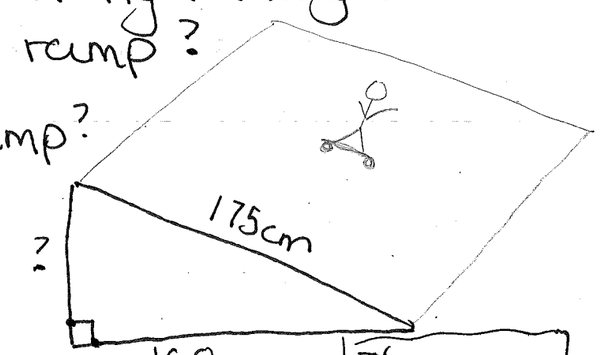
$a^2+b^2=c^2$

$1089+3136=3600$

$\boxed{\text{No, not square corners}}$

Ex2. A ramp has a horizontal length of 168cm and a sloping length of 175cm. The side view is a right triangle. How high is the ramp?

1) How high is the ramp?
2) math words - none
* 3) draw a picture
4) Solve and Answer
   - a, b, c



?, 168, 175

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

$a^2+28224=30625$

$-28224 \quad -28224$

$a^2=2401$

$\sqrt{a^2}=\sqrt{2401}$

$a=49$

$\boxed{\text{The ramp is 49cm high}}$