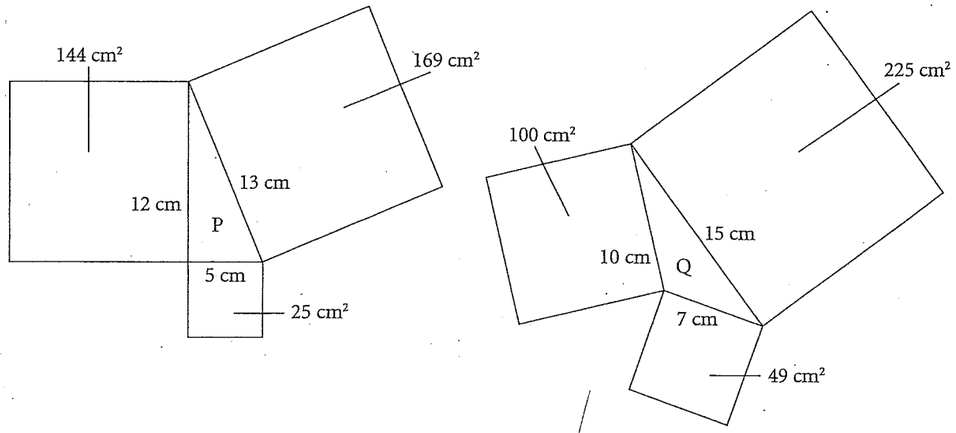
1.6 Exploring the Pythagorean Theorem

Quick Review

At Home / At School

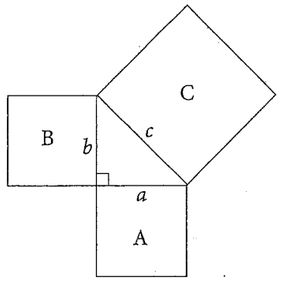
- The Pythagorean Theorem is true for right triangles only.
- To see which triangle is a right triangle, check to see if the area of the square on the longest side is equal to the sum of the areas of the squares on the other two sides.



$25\ cm^2 + 144\ cm^2 = 169\ cm^2$ $\qquad$ $49\ cm^2 + 100\ cm^2 \neq 225\ cm^2$

The Pythagorean Theorem applies to triangle P, but not to triangle Q.

- A set of three whole numbers that satisfy the Pythagorean Theorem is called a Pythagorean triple. For example, 5-12-13 is a Pythagorean triple because $5^2 + 12^2 = 13^2$
- For a right triangle:
  area of square on the longest side (square C) = area of square A + area of square B



- For a Pythagorean triple *a-b-c*:
  $c^2 = a^2 + b^2$

1.6 Exploring the Pythagorean Theorem

Review

7 vs 7^2 vs 49 vs $\sqrt{49}$

What do they mean? Which ones are the same?

$7 = \sqrt{49}$ $\qquad$ $7^2 = 49$

New Pythagorean Theorum: only works for right angle triangles

Triangles

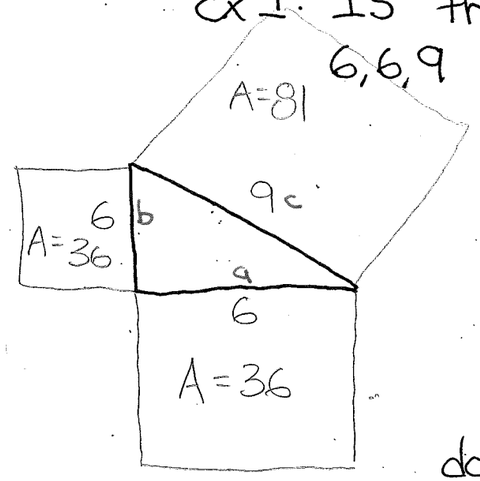
right △ 1 angle = 90°

acute △ all angles less 90°

obtuse △ 1 angle greater than 90°

You can use Pythagorean Theorem to find out if the triangle is a right angle triangle

Ex 1: Is the triangle with side lengths 6, 6, 9 a right angle triangle?



1) label a, b, c
   s m L
   m m L

2) calculate a^2, b^2, c^2
   $a=6$ $\quad b=6$ $\quad c=9$
   $a^2=36$ $\quad b^2=36$ $\quad c^2=81$

3) check if $a^2+b^2=c^2$
   does $36+36=81$? NO; then it's not a right triangle!!

Pythagorean Triple: a set of 3 whole #'s that follows $a^2+b^2=c^2$

s m m m L L

Ex 2: Are 8, 15, 18 a Pythagorean Triple (P.T.)

1) label a, b, c

s m L

8, 15, 18

2) a^2, b^2, c^2 (calculate)

$a=8$ $b=15$ $c=18$

$a^2=64$ $b^2=225$ $c^2=324$

3) check if $a^2+b^2=c^2$

$64+225=324$ NO!! ∴ not a P.T.

Ex 3: Are 11, 60, 61 a P.T.

s m L

a b c

1) label a, b, c

2) Calculate a^2, b^2, c^2

$a=11$ $b=60$ $c=61$

$a^2=121$ $b^2=3600$ $c^2=3721$

3) check if $a^2+b^2=c^2$

$121+3600=3721$ YES ∴ 11, 60, 61 is a Pythagorean Triple!!