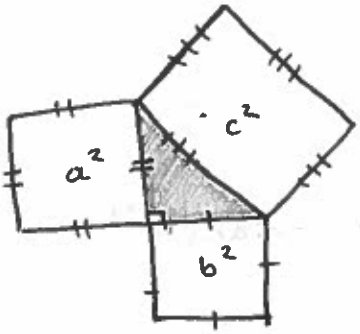
B: Exploring the Pythagorean Relationship



For a right triangle:

→ The sum of areas a^2 and b^2 will equal the area of the square attached to the hypotenuse.

hypotenuse (always across from the right, (90°) angle!

Pythagorean Theorem

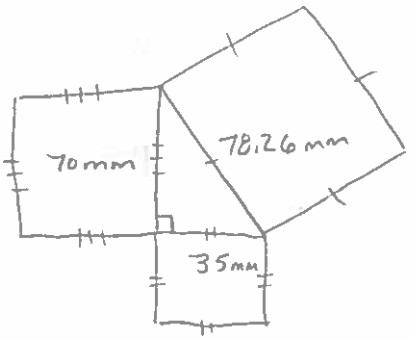
$a^2 + b^2 = c^2$

* c must always be the hypotenuse! it is the longest side.

Examples:

1. A right triangle has side lengths 35 mm, 70 mm, and 78.26 mm.

a) Draw a square on each side of the triangle.



b) What are the areas of each square?

$A_1 = s^2$
$= (70)^2$
$= 4900\ mm^2$

$A_2 = s^2$
$= 35^2$
$= 1225\ mm^2$

$A_3 = s^2$
$= (78.26)^2$
$= 6124.63\ mm^2$

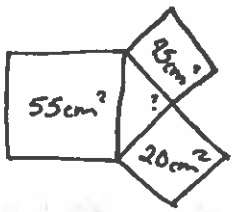
c) Write an addition statement to the nearest whole number with the three areas.

area of triangle + area of triangle = area of "hypotenuse" square

a^2 + b^2 = c^2

4900 mm^2 + 1225 mm^2 = 6125 mm^2

2. Is the triangle shown a right triangle?



In a right triangle:

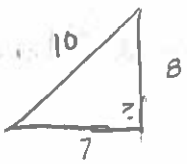
$A_1 + A_2 = A_3$ → must be attached to hypotenuse

45 cm^2 + 20 cm^2 = 65 cm^2 * Hypotenuse area = 55 cm^2

∴ not a right triangle.

3. A triangle has side lengths of 7m, 8m and 10m

Is the triangle a right triangle?



$a^2 + b^2 = c^2$ c must be hypotenuse.

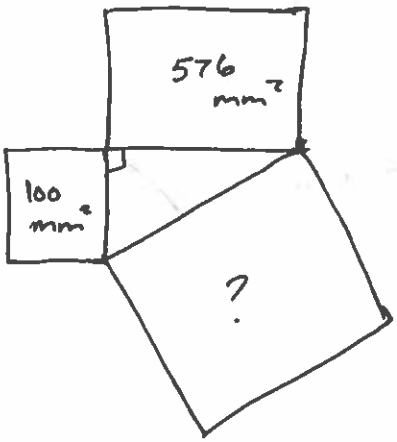
$7^2 + 8^2 = 10^2$

$49 + 64 = 100$

$113 \neq 100$

The triangle is not a right triangle

4] Use the pythagorean relationship to find the unknown area.



→ hypotenuse area

$A_1 + A_2 = A_3$

$576 + 100 = A_3$

$676\text{mm}^2 = A_3$

Assignment Pg. 92 # 5-11 (odd questions), 12 (a & c), 13, 15, 17