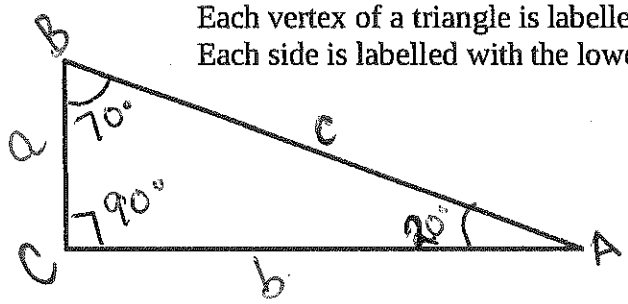
Chapter 8: Relationships in Right Triangles Name:

Pythagorean Theorem

Triangles

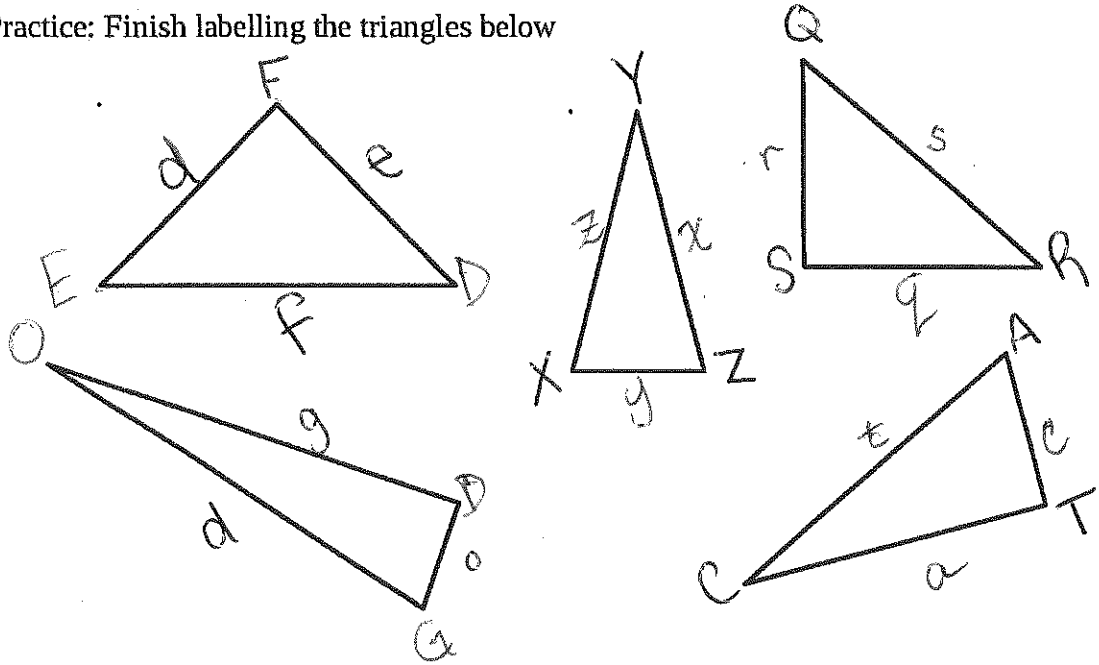
- The angles in any triangle are always supplementary (add to 180°)
- A triangle is composed of three sides and three vertices (plural of vertex)
- To identify the side or vertex in a triangle, it is important to label the triangle following a standard routine:

Each vertex of a triangle is labelled with a capital letter
Each side is labelled with the lower case letter that matches the opposite vertex.

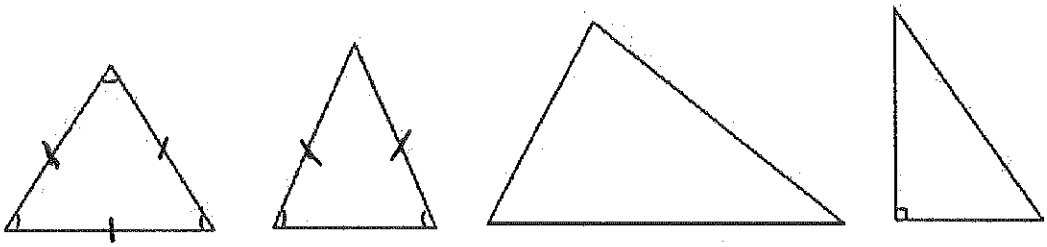


$90 + 70 + 20 = 180°$

Practice: Finish labelling the triangles below



Types of Triangles



Equilateral Isosceles Scalene Right

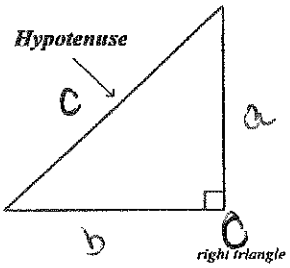
Pythagorean Theorem

Pythagoreas was a Greek philosopher and mathematician.
Lived 570 – 495 BC 495 + 2015 = 2510 years.

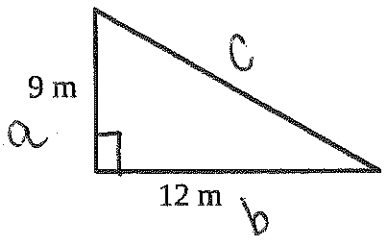
Pythagoream Theorem: States that the square of the hypotenuse is equal to the sum of the squares of the other two sides.

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

The side of the triangle that is opposite the 90° angle is always called the hypotenuse. It is labelled in the triangle below. The other two sides of the triangle are called legs.



To solve for the length of the hypotenuse:



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

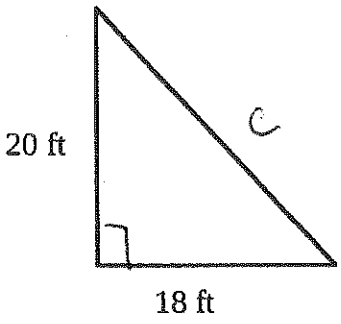
$9^2 + 12^2 = c^2$

$81 + 144 = c^2$

$\sqrt{225} = \sqrt{c^2}$

$c = 15$ m

Practice: Find the hypotenuse

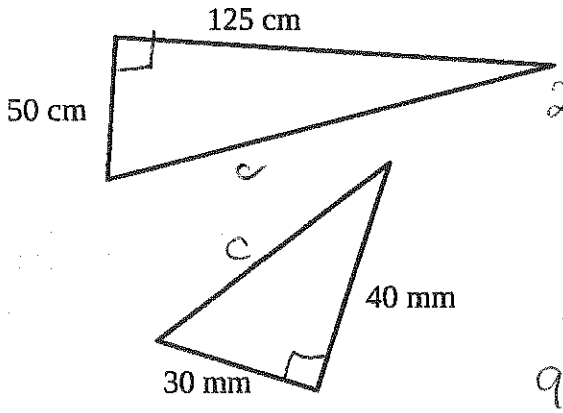


$20^2 + 18^2 = c^2$

$400 + 324 = c^2$

$\sqrt{724} = \sqrt{c^2}$

$c = 26.9$ ft



$50^2 + 125^2 = c^2$

$2500 + 15625 = c^2$

$\sqrt{18125} = \sqrt{c^2}$

$c = 134.6$ cm

$30^2 + 40^2 = c^2$

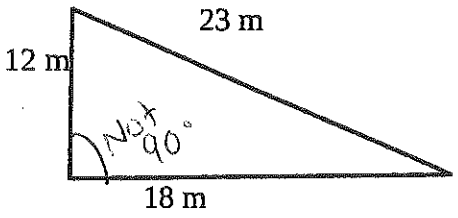
$900 + 1600 = c^2$

$\sqrt{2500} = \sqrt{c^2}$

$c = 50$ mm

The Pythagorean theorem can also be used to confirm if a triangle is a right triangle.

Is this a right triangle?

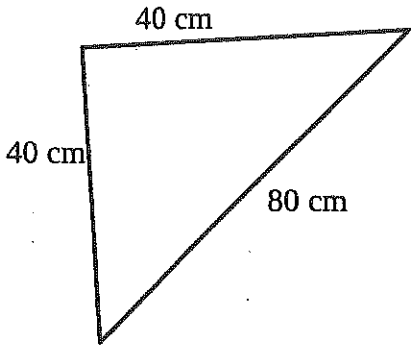


$12^2 + 18^2 = 23^2$

$144 + 324 = 529$

$468 = 529$ ← Not true!

Not a right triangle



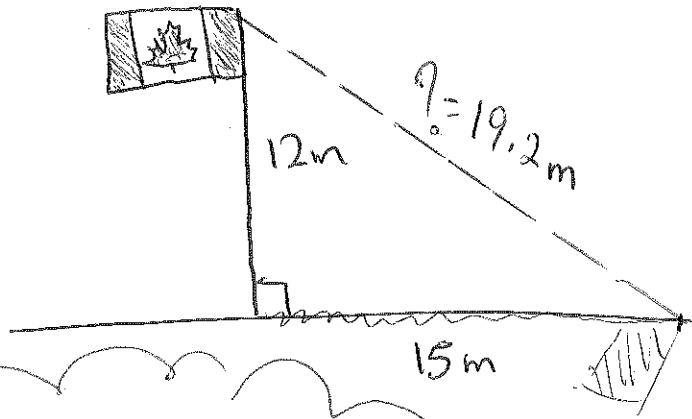
$40^2 + 40^2 = 80^2$

$1600 + 1600 = 6400$

$3200 = 6400$ ← No true!

Not a right Δ

A flagpole is 12 metres tall. It makes a shadow on the ground that is 15 metres long. How long is a line that joins the top of the flagpole with the end of the shadow? Draw a diagram and show your work.



$12^2 + 15^2 = c^2$

$144 + 225 = c^2$

$\sqrt{369} = \sqrt{c^2}$

$19.2 = c$

Pg 212-213
2, 9, 10

Pg 216-217
1, 3, 4, 5, 7