## 2.4 The Cosine Law
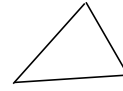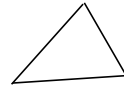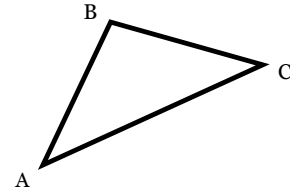
Two situations where the Sine Law <span style="color:red">WILL NOT</span> work...
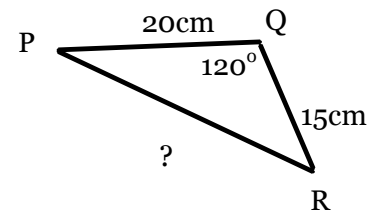
So we therefore need a new strategy... called the COSINE LAW.
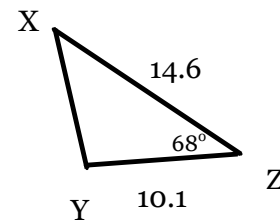
Solving for a side with the COSINE law...

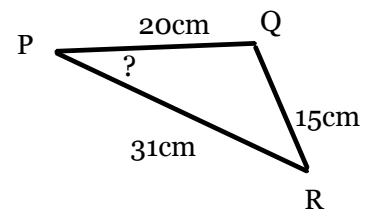Example...                                    Your Turn...
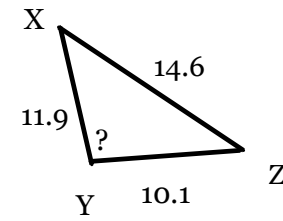
Solving for an angle with the COSINE law...

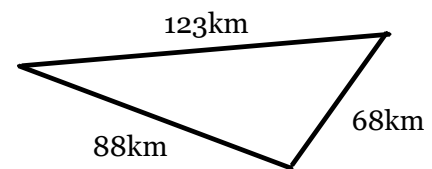Example...                                    Your Turn...



Note:  If you have to choose an angle to solve for, choose the largest one!

Example:  Solve the triangle.

Mitchell wants his 8.0 wide house to be heated with a solar hot-water system. The tubes form an array that is 5.1 m long. In order for the system to be effective, the array must be installed on the south side of the roof and the roof needs to be inclined by 60°. If the north side of the roof is inclined more than 40°, the roof will be too steep for Mitchell to install the system himself. Will Mitchell be able to install this system by himself?
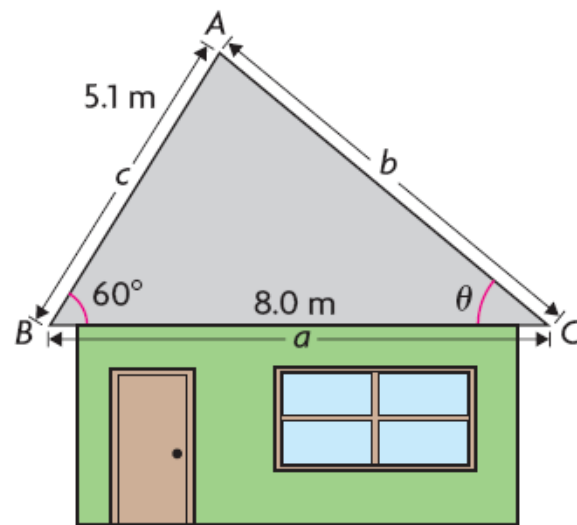
# Homefun

Pg 119 #(1, 2, 4, 5)ac, 7, 8, 10, 14, 15, 20, 23

## Key Idea

- Given any triangle, the cosine law can be used if you know
  - two sides and the angle contained between those sides (SAS) or
  - all three sides (SSS)

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## Need to Know

- The cosine law states that in any $\triangle ABC$,

$$a^2 = b^2 + c^2 - 2bc \cos A$$
$$b^2 = a^2 + c^2 - 2ac \cos B$$
$$c^2 = a^2 + b^2 - 2ab \cos C$$