

7.3 Laws of Cosine

Used to solve case 3 (SAS) and case 4 (SSS)

$$c^2 = a^2 + b^2 - 2ab \cos \gamma$$

$$b^2 = a^2 + c^2 - 2ac \cos \beta$$

$$a^2 = b^2 + c^2 - 2bc \cos \alpha$$

Theorem:

The square of one side of a triangle equals the sum of the squares of the other two sides minus twice their product times the cosine of their included angle.

Ex. 1 Use laws of cosines to solve a SAS triangle given:

$$a = 2, b = 3, \gamma = 60$$

Ex. 2 Use law of cosines to solve a SSS triangle given:

$$a = 4, b = 3, c = 6$$