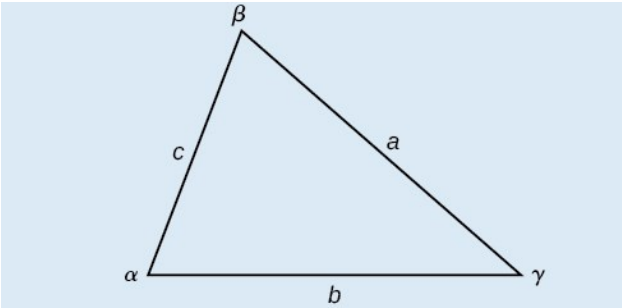
Law of Cosines

Trigonometry

Law of Cosines

Fact – Law of Cosines



For triangles labeled as the triangle to the right, with angles α, β, and γ, and opposite corresponding sides a, b, and c, respectively, the Law of Cosines is given as three equations.

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

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

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

Examples

For the following exercises, assume the angles and sides are as in the triangle above. Solve each triangle. Round to the nearest tenth.

1. $\beta = 30°, a = 10, c = 12$

2. $\gamma = 41.2°, b = 6, c = 7$

3. $a = 20, b = 25, c = 18$

4. $a = 108, b = 132, c = 160$

Remixed from OpenStax *Algebra and Trigonometry 2e*
Access for free at https://openstax.org/books/algebra-and-trigonometry-2e/pages/1-introduction-to-prerequisites

You Try It

For the following exercises, assume the angles and sides are as in the triangle above. Solve each triangle. Round to the nearest tenth.

1. $\alpha = 30°, b = 12, c = 24$
2. $\beta = 58.7°, a = 10.6, c = 15.7$
3. $a = 5, b = 7, c = 10$
4. $a = 13, b = 22, c = 28$