

Algebra II  
Section 14-5  
Law of Cosines

Goal: to use the Law of Cosines to solve triangles

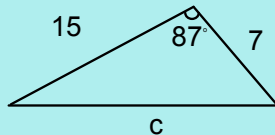
Review of previous topics:

- SohCahToa - for 90 degree triangles only
- Law of Sines - when you know an angle, a corresponding side and one other measurement

Today we are going to talk about the **Law of Cosines** (for either of these two situations)

- you know two sides and the angle between
- you know the three side measurements

In this triangle, why can't we use the Trig ratios or Law of Sines?



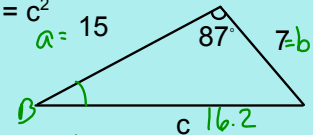
Law of Cosines:

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

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Solve for c



$$15^2 + 7^2 - 2(15)(7)\cos(87) = c^2$$

$$\sqrt{263.01} = \sqrt{c^2}$$

$$16.2 \approx c$$

The lengths of two sides of a triangle are 8 and 10 and the angle between them is 40 degrees. What is the length of the 3rd side?

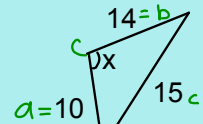
$$a^2 + b^2 - 2ab\cos C = c^2$$

$$8^2 + 10^2 - 2(8)(10)\cos 40 = c^2$$

$$c \approx 6.4$$



Solve for x.



$$10^2 + 14^2 - 2(10)(14)\cos X = 15^2$$

$$\frac{-280\cos X = -71}{-280}$$

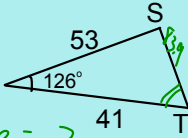
$$x \approx 75.3^\circ$$

Find measure of angle

T.

$$53^2 + 41^2 - 2(41)(53)\cos R$$

$$83.9 \approx c$$



$$\frac{83.9}{\sin 126} = \frac{53}{\sin T}$$

$$\frac{53 \sin 126}{83.9} = \frac{83.9 \sin T}{83.9}$$

$$\sin^{-1}\left(\frac{53 \sin 126}{83.9}\right) = \sin^{-1}(\sin T)$$

$$T = 30.7^\circ$$

Hwk: pg 939 - 940

#10-20 evens, 27, 30, 31,

34, 35, 40, 46, 51