

Geometry

Chapter 8
Section 8-6

Fill out the Table

Sides Given	Angles Given	To Find...	How to solve...
Any Two	Right Angle	Third Side	Use Pythagorean
Hypotenuse	45 and 90	Either Leg	Divide by $\sqrt{2}$
Short Leg	30 and 90	Hypotenuse	Multiply by 2
\overline{BC} and \overline{AC}	$\angle B$ (no 90)	$\angle A$	Use Law of Sines
Long Leg	60 and 90	Hypotenuse	Divide $\sqrt{3}$, Multiply 2
Hypotenuse	47 and 90	From 47 to 90	Use cosine
\overline{LN} and \overline{PN}	$\angle N$ (no 90)	\overline{LP}	Use Law of Cosines

Law of Cosines

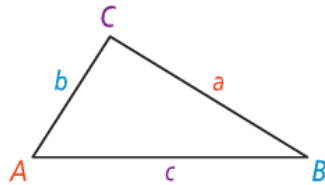
Key Concept Law of Cosines

For any $\triangle ABC$, the **Law of Cosines** relates the cosine of each angle to the side lengths of the triangle.

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

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

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



Using Law of Cosines

What is the length of the third side of the triangle?

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

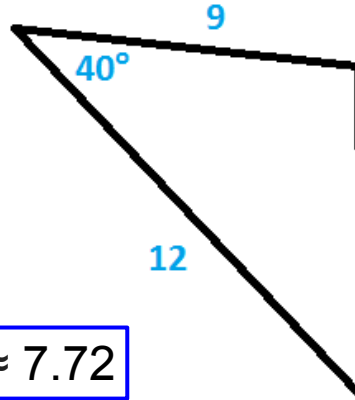
$$a^2 = 9^2 + 12^2 - 2(9)(12)\cos(40)$$

$$a^2 = 81 + 144 - 216\cos(40)$$

$$a^2 = 225 - 216\cos(40)$$

$$a = \sqrt{225 - 216\cos(40)}$$

$$a \approx 7.72$$



Using Law of Cosines

What is the measure of angle x ?

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

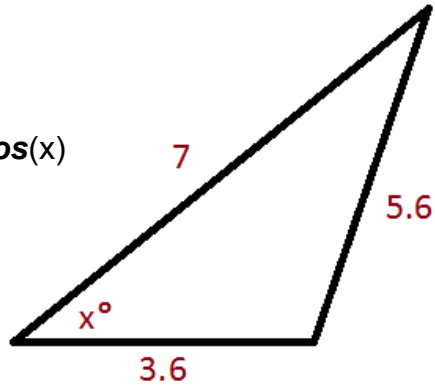
$$(5.6)^2 = (7)^2 + (3.6)^2 - 2(7)(3.6)\cos(x)$$

$$31.36 = 49 + 12.96 - 50.4\cos(x)$$

$$-30.6 = -50.4\cos(x)$$

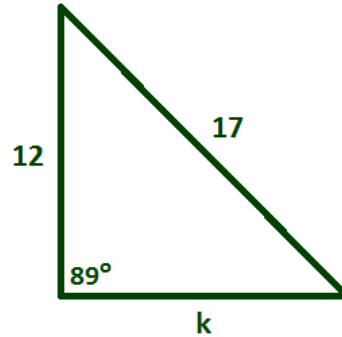
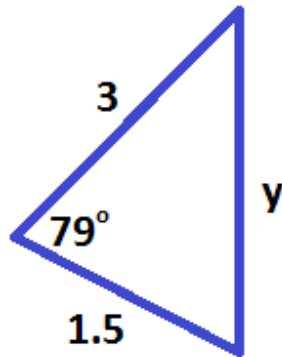
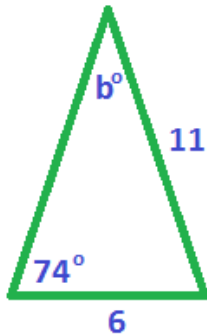
$$x = \cos^{-1}\left(\frac{-30.6}{-50.4}\right)$$

$$x \approx 52.62$$



How Would You Solve?

Do you solve using Law of Sines or Law of Cosines?



Law of Sines

*Two pairs of opposite
Angle-Side
sides*

of Sines

Law of Cosines

Side-Angle-Side

*relationship
Unknown side*

*opposite the angle
proportions twice*

Law of

No Side-

relationship

Use Law

Homework

Page 530 - 531

7 - 17 all, 19 - 22 all