THE COSINE LAW

We can use the cosine law when we know:

SIDE - SIDE - SIDE (SSS)





SIDE - ANGLE - SIDE (SAS)

KEY WORDS Length Two sides Opposite angle

THE COSINE LAW: SOLVING FOR SIDES

If you need to find the <u>length</u> of a side, you need to know the other <u>fine</u> and the <u>opposite</u> only. You need to use the version of the Cosine Rule where a^2 is the subject of the formula:

side to find
$$a^2 = b^2 + c^2 - 2bc \cos(A)$$
, opposite angle to side to find

Side a is the one you are trying to find. Sides b and c are the other sides, and angle A is the angle opposite to side a.

THE COSINE LAW: SOLVING FOR AN ANGLE

If you need to find the size of an angle, you need to use the version of the Cosine Rule where the cos(A) is on the left:

$$\cos(A) = \frac{b^2 + c^2 - a^2}{2bc}$$

It is very important to get the terms on the top in the correct order; b and c are either side of angle A which you are trying to find and these can be either way around, but side a must be the side opposite angle A.

The **COSINE LAW** can be used to solve triangles when given information includes:

- SIDE SIDE SIDE
- TWO SIDE MEASURES AND AN ANGLE IN BETWEEN THOSE SIDES.

EXAMPLES:



2. Find the measure of the marked angle to the nearest degree

A
14 ft b
14 ft 17 ft cos A =
$$\frac{b^2 + c^2 - a^2}{2 \cdot b \cdot c}$$
 erax the labels from the Δ , because
 $\frac{14 \text{ ft}}{2 \cdot b \cdot c}$ we will label it based on the formula
 $\frac{16 \text{ ft}}{c}$ $\cos X = \frac{17^2 + 16^2 - 14^2}{2 \cdot 17 \cdot 16}$
 $\cos X = \frac{349}{544}$
 $\cos X = 0.6415$
 $\cos^{-1}(0.6415) = X$
 $[X = 50]$

3. Solve ABC given a = 9 cm, b = 7 cm, and c = 8 cm

Cosine Law Practice

1. Find the measure of the unknown side to the nearest tenth.

¥ = 86



5. Mark says he can solve the following triangle using the sine law. Cassandra says she can solve the triangle using the cosine law. Who is correct? Explain.



COMPLETE: p. 38 #3b, 4bc, 7c, 8-10, 17