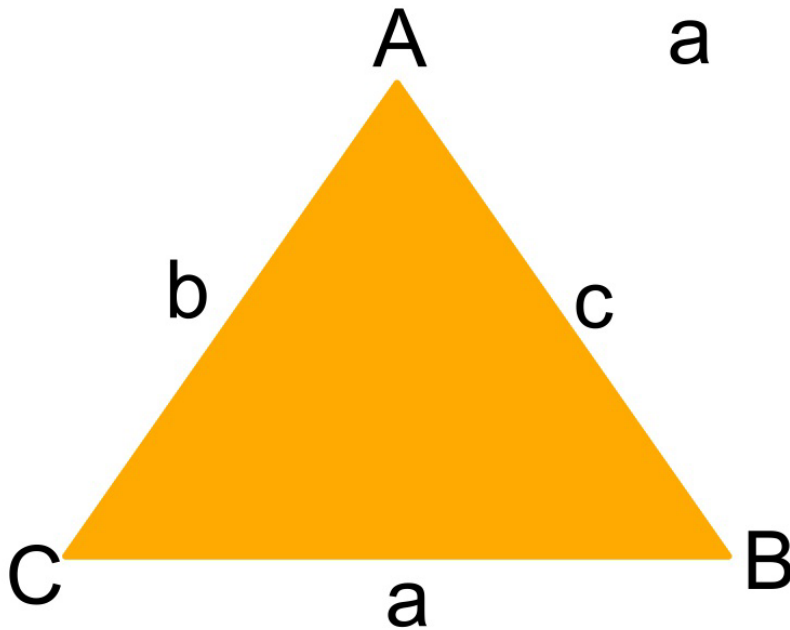# Law of Sines
&
Law of Cosine

Law of Sines

- The ratio of the Sine of one angle and the length of the side opposite is equivalent to the ratio of the Sine of another angle and its side opposite's length.
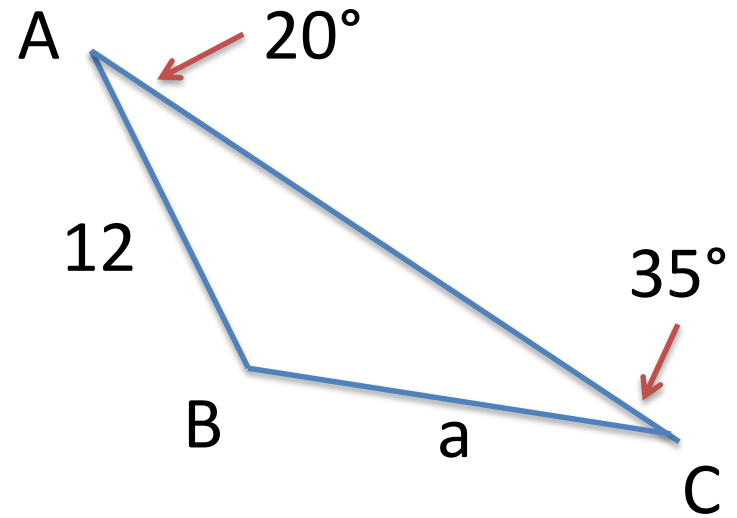
Law of Sines

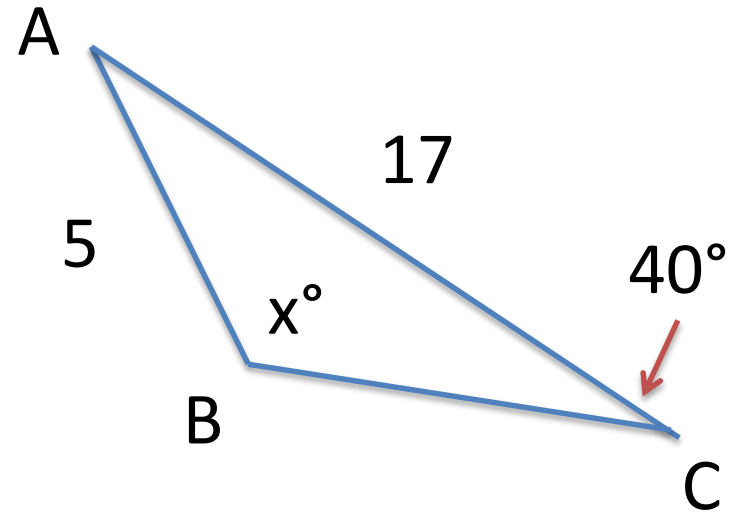$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

How to Use Law of Sines:

- Fill in any of the ratios with the information provided using Sine

- Solve for the missing piece

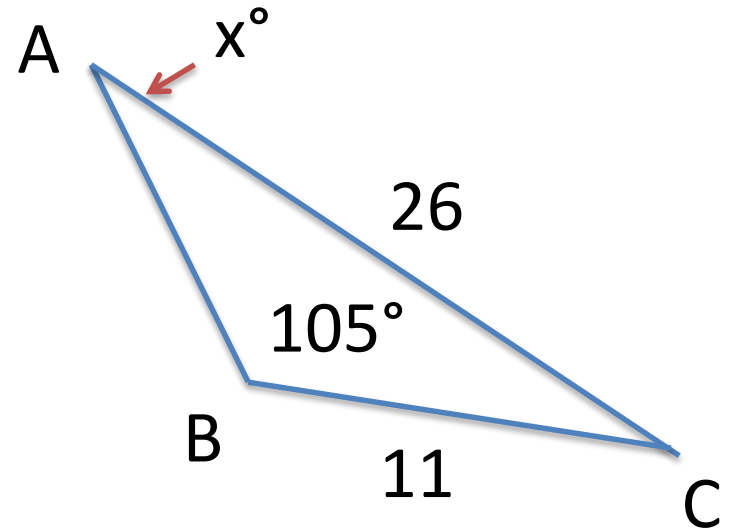✧ *You will **NEVER** use all three ratios together in one problem!*
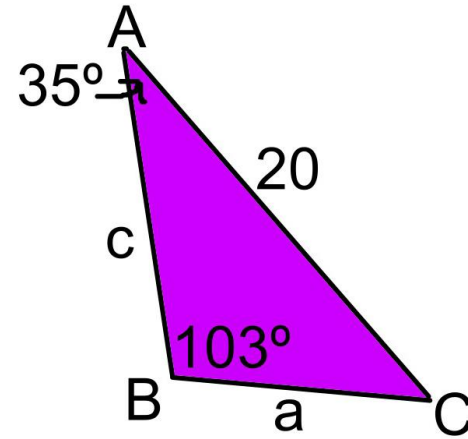
Using Law of Sines, find the length of side a.

A 20°

12

35°

B a C

Using Law of Sines, find the measure of < B.

Using Law of Sines, find the measure of < A.

A
x°

26

105°

B

11

C

Using Law of Sines, find all the missing parts of the triangle.

A

35° →

20

c

103°

B   a   C

Warm-up 10/9

1. Find the measure of <C
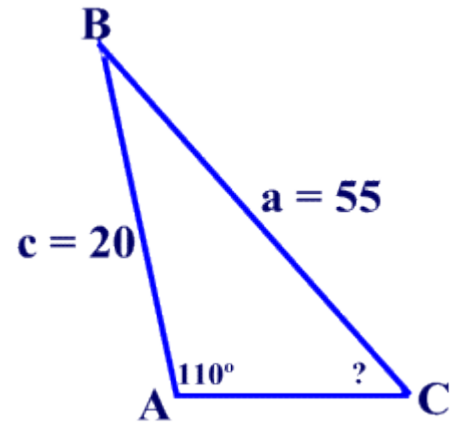
2. Given <A = 27°, <B = 100°, side b = 10, what is the measure of side a? Round your answer to two decimal places.

Set calculator to DEGREES Mode

Law of Cosines

- When given the length of two sides and the measure of an angle that is not opposite those two sides we use Law of Cosine to find the length of the third side.
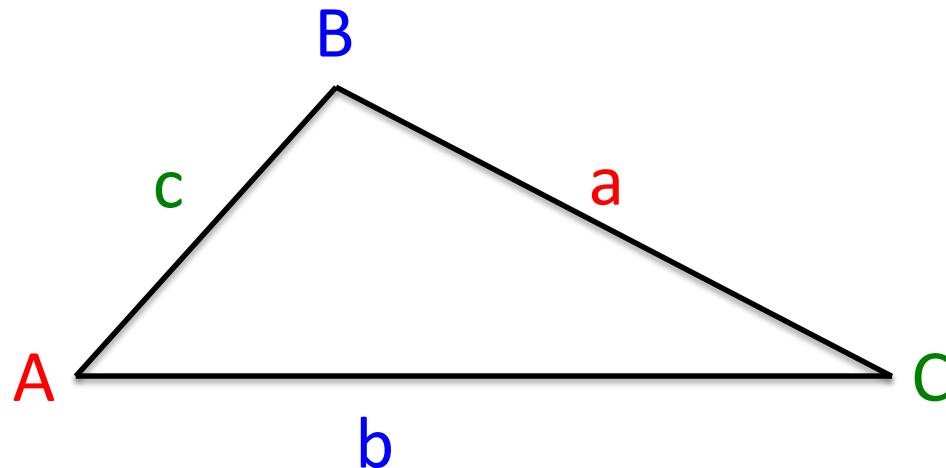
Law of Cosines

LETTER OF MISSING SIDE OR ANGLE →
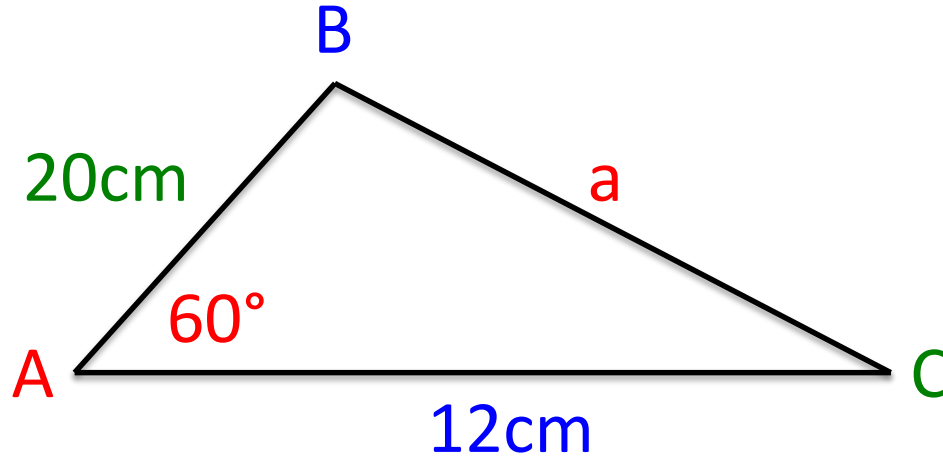
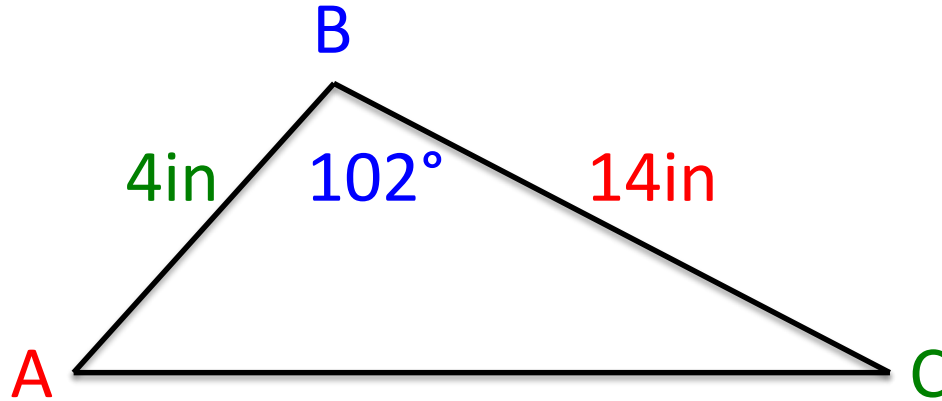$$c^2 = a^2 + b^2 - 2ab\cos C$$

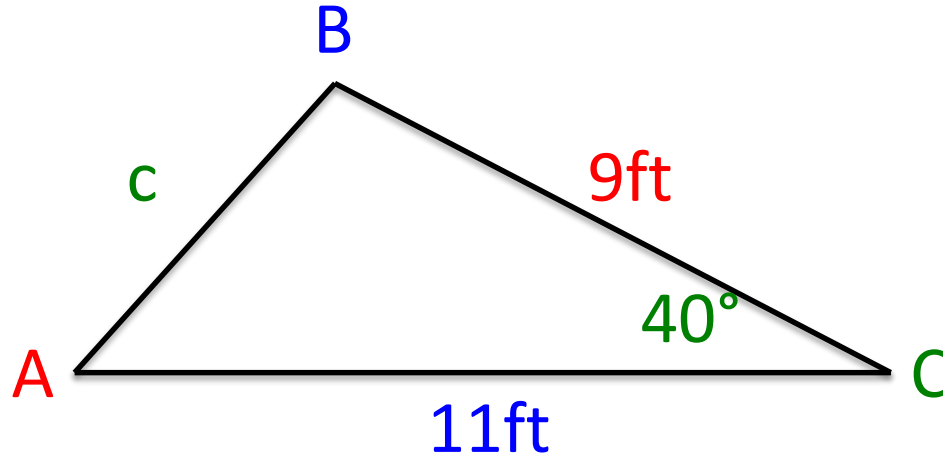$$b^2 = a^2 + c^2 - 2ac\cos B$$

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

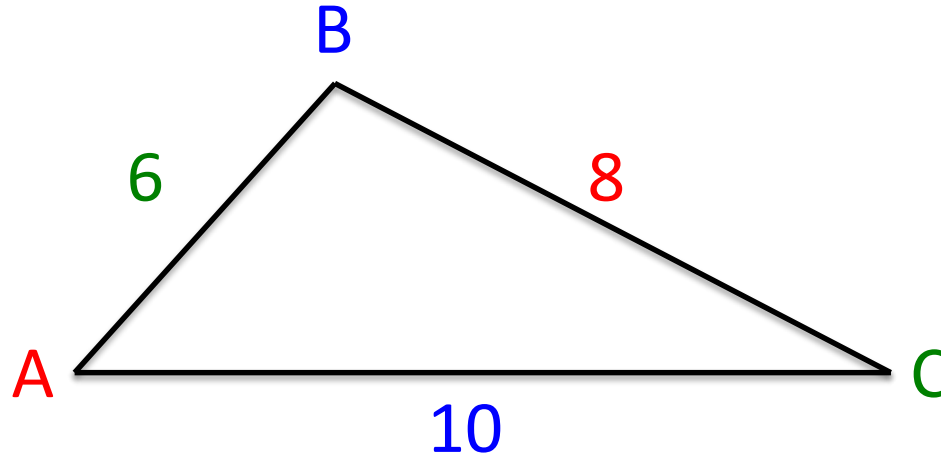Using Law of Cosines, find the length of side a *to the nearest centimeter*.

Using Law of Cosines, find the length of side b *to the nearest inch.*

B

4in   102°   14in

A   C

Using Law of Cosines, find the length of side c *to the nearest foot*.

Using Law of Cosines, find the measure of <B *to the nearest degree.*

Homework Assignment

Find the measure of the missing side of each triangle.

1. In Δ ABC, m<A = 102°, m<B = 34°, and a = 25.8. Find b to the nearest tenth.

2. In Δ DEF, m<D = 56°, m<E = 44°, and d =37.5. Find e to the nearest tenth.

Find the measure of the angle in question to the nearest degree.

3. In Δ ABC, a = 8, b = 12, m<A = 30°. Find m<B.

4. In Δ DEF, d = 16, e = 8, m<E = 30°. Find m<D.

Find the measure of the third side of each triangle.

5. In Δ ABC, b = 4, c = 4 and m< A = 60°

6. In Δ DEF, d = 126, e = 214 and m< F = 42°

Find the measure of the angle in question to the nearest degree.

7. In Δ ABC, a = 4, b = 6, c = 8. Find m<A.

8. In Δ DEF, d = 15, e = 12, f = 8. Find m<E.