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Using Sine and Cosine - Step-by-Step Lesson

Use the Law of Sine and the Law of Cosine to find the missing sides and angles of each triangle.

BC = 12, <B = 42°, and <C = 30°

Explanation:

We need to find 1) angle A 2) length of AC 3) length of AB

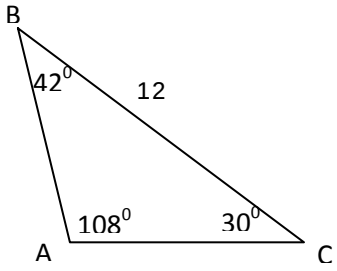
Start with the missing angle:

∠A + ∠B + ∠C = 180°

∠A + 42° + 30° = 180°

∠A + 72° = 180° (Subtract 72° from both sides)

∠A = 108°



The law of sin is based on the proportionality of side and angle in triangle. The law states that for the angle of a non right angle, each angle of the triangle has the same ratio of angle measure to sine value.

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

Substitute the known value into the law of Sine to find AB.

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$$\frac{\sin(30)}{c} = \frac{\sin(108)}{12}$$

Solve the equation for AC

AB = c = 6.31

The law of sine is based on the proportionality of side and angle in triangle. The law states that for the angle of a non right angle, each angle of the triangle has the same ratio of angle measure to sine value.

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

Substitute the known value into the law of sin to find AC.

$$\frac{\sin(108)}{12} = \frac{\sin(42)}{AC}$$

Solve the equation for AC

AC = b = 8.44