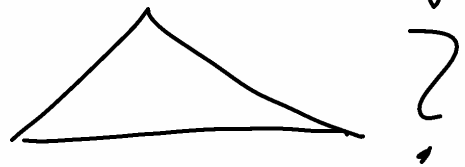


SINE & COSINE LAWS

Thu 16 MAY 2019

We saw last day how we can use the trigonometric ratios to solve RIGHT Triangles . But what about an arbitrary triangle like



Answer: SINE & COSINE LAWS

SINE LAW: (acute triangle)

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

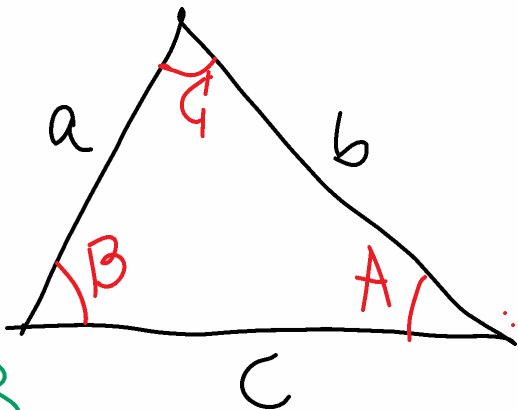
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

(ASA)

b & c are
contiguous to A

a & c are
contiguous to B

a & b are contiguous to C



a is opposite to A

b is opposite to B

c is opposite to C

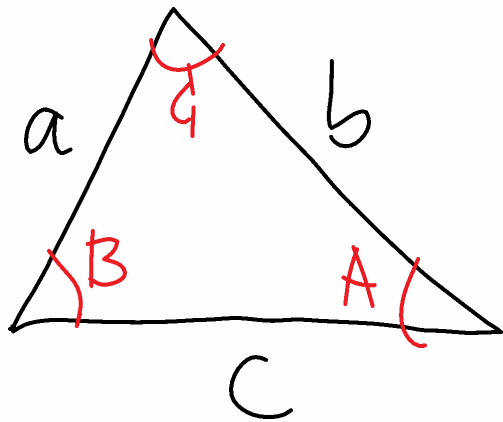
COSINE LAW:

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

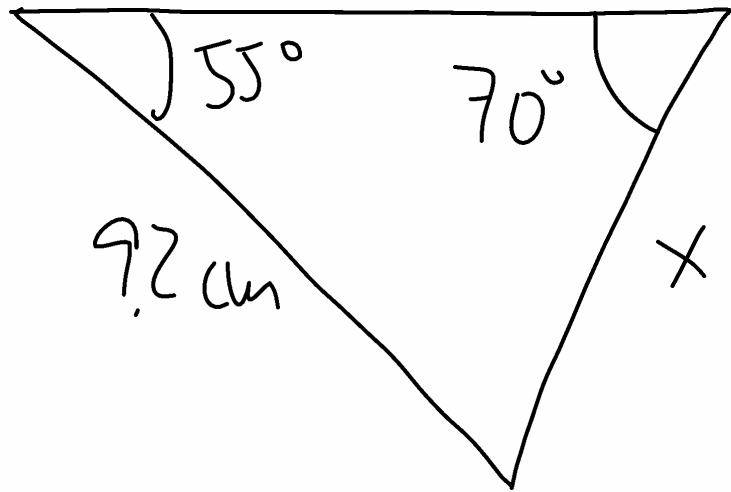
$$b^2 = a^2 + c^2 - 2ac \cos B$$

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

(SAS)



EXAMPLES



Determine x

$x?$

1. st: It's not Right triangle $\Rightarrow$

$\Rightarrow$ we need use either sine/cosine law

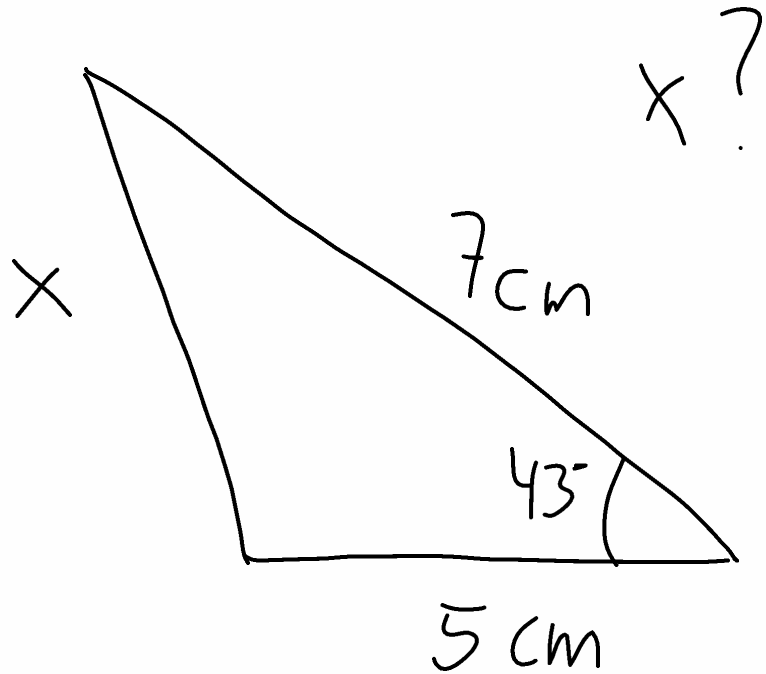
2: We are given 2 sides & 1 angle

$\Rightarrow$ ASA $\Rightarrow$ Sine law

$$\frac{x}{\sin 55} = \frac{9.2}{\sin 70}$$

$$\Rightarrow \boxed{x = 9.2 \cdot \frac{\sin 55}{\sin 70} \approx 8.02 \text{ cm}}$$

EXAMPLE 2



As we have 2 sides & 1 angle $\Rightarrow$
 $\Rightarrow$ cosine law

$$x^2 = 7^2 + 5^2 - 2 \cdot 7 \cdot 5 \cdot \cos 43$$

$$x^2 = 49 + 25 - 70 \cdot \cos 43 = 74 - 70 \cos 43$$

$$x^2 = 74 - 70 \cdot 0.7314 \approx 22.81$$

$$\boxed{x \approx \sqrt{22.81} \approx 4.76 \text{ cm}}$$