

How do you know what to do?

• Right Triangle $c^2 = a^2 + b^2$

(SOHCAHTOA) $\sin \theta = \frac{\text{opp}}{\text{hyp}}$ $\cos \theta = \frac{\text{adj}}{\text{hyp}}$ $\tan \theta = \frac{\text{opp}}{\text{adj}}$

$$\text{Area} = \frac{1}{2}bh$$

• Non-Right Triangle

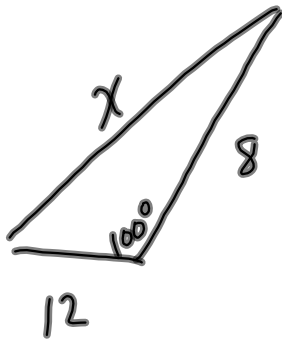
Law of Sines: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ (watch for SSA)

Law of Cosines: $c^2 = a^2 + b^2 - 2ab \cos C$

SAS \Rightarrow find the third side

SSS \Rightarrow find an angle

$$\text{Area} = \frac{1}{2}ab \sin C \quad (\text{SAS})$$

Example

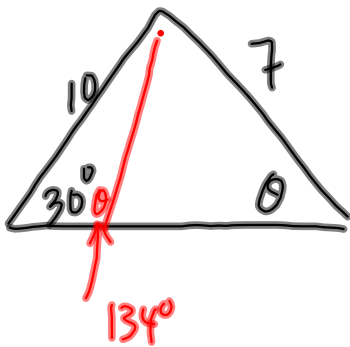
Law of cosines:

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

$$c^2 = 12^2 + 8^2 - 2(12)(8) \cos 100^\circ$$

$$c \doteq 15,5$$

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12^2+8^2-2*12*8cos
(100
241.3404501
√(Ans
15.53513599
■
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Example

Law of Sines:

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

$$\frac{7}{\sin 30^\circ} = \frac{10}{\sin \theta}$$

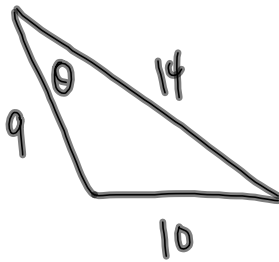
$$\frac{10 \sin 30^\circ}{7} = \frac{7 \sin \theta}{7}$$

$$\sin \theta = \frac{10 \sin 30^\circ}{7}$$

$$\theta = \sin^{-1} \left(\frac{10 \sin 30^\circ}{7} \right)$$

$$\theta = 45.6^\circ \text{ or } 134.4^\circ$$

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10*sin(30)
5
Ans/7
.7142857143
sin^-1(Ans
45.5846914
■
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Example

Law of Cosines:

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

$$10^2 = 9^2 + 14^2 - 2(9)(14) \cos \theta$$

$$100 = 81 + 196 - 252 \cos \theta$$

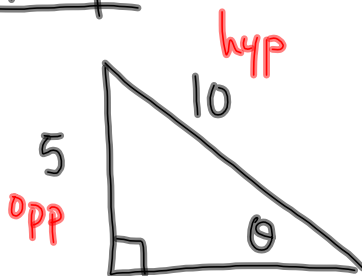
$$100 - 81 - 196 = -252 \cos \theta$$

$$\frac{-177}{-252} = \frac{-252 \cos \theta}{-252}$$

$$\cos \theta = \frac{-177}{-252}$$

$$\theta = \cos^{-1} \left(\frac{-177}{-252} \right)$$

$$\theta = 45.4^\circ$$

Example

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\sin \theta = \frac{5}{10}$$

$$\theta = \sin^{-1} \left(\frac{5}{10} \right)$$

$$\theta = 30^\circ$$