

The Sine Law (2 formats) for  $\Delta ABC$ :

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

or

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

The Cosine Law (2 formats) for  $\Delta ABC$ :

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

or

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

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The Sine Law only works when we have certain combinations of sides and angles.

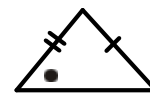
The Cosine Law provides different combinations that can be used to solve a triangle.

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## When to Use Sine Law or Cosine Law *May 20/2016*

Use the Sine Law given:

- two sides and an angle to find a second angle (SSA).

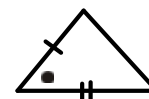


- two angles and a side to find a second side (SAA).



Use the Cosine Law given:

- two sides and the contained angle to find the third side (SAS).

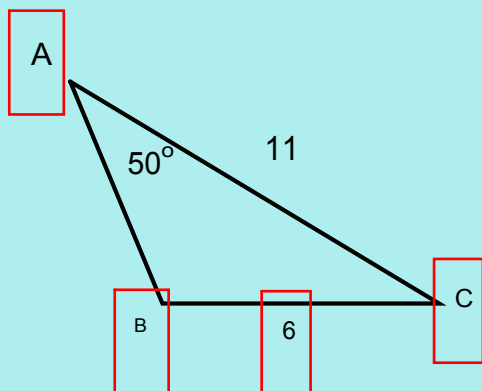


- three sides, and find any angle (SSS).



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Ex.1 SSA: What can we solve for?



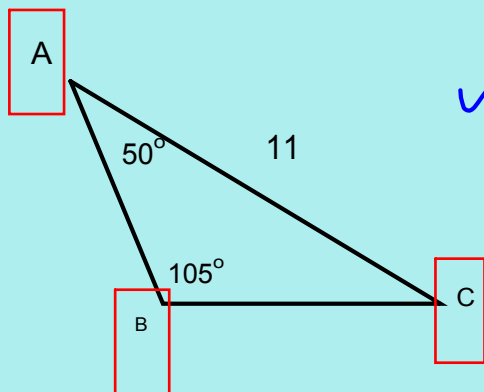
$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

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

*quadratic equation in 'c'*

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Ex.2 AAS: What can we solve for?



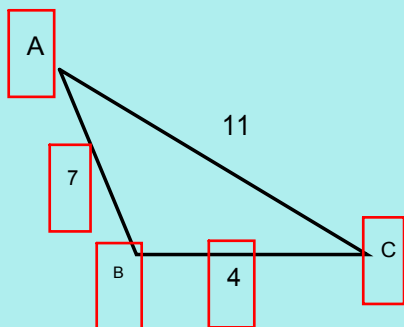
$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

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

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

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Ex.3 SSS: What can we solve for?



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

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

$$4^2 = 11^2 + 7^2 - 2(11)(7) \cos A$$

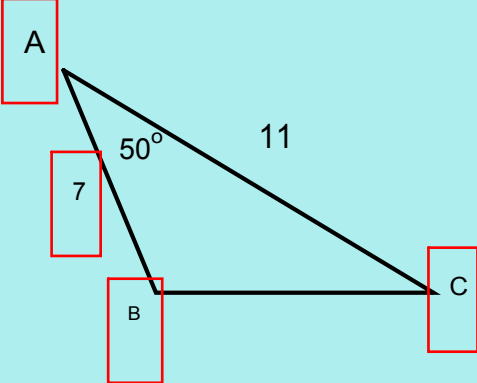
$$16 = 121 + 49 - 154 \cos A$$

$$154 \cos A = 170 - 16$$

$$154 \cos A = 154$$

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Ex.4 SAS: What can we solve for?



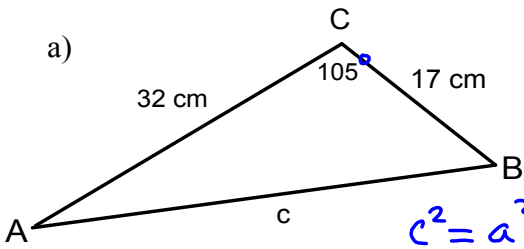
$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

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

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Ex.1 Which law would you use to solve for the indicated angle or side in each of the following triangles?

a)

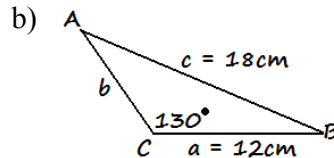


SAS  
cosine law

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

$$c^2 = 17^2 + 32^2 - 2(17)(32) \cos 105^\circ$$

b)



SSA  
Sine law

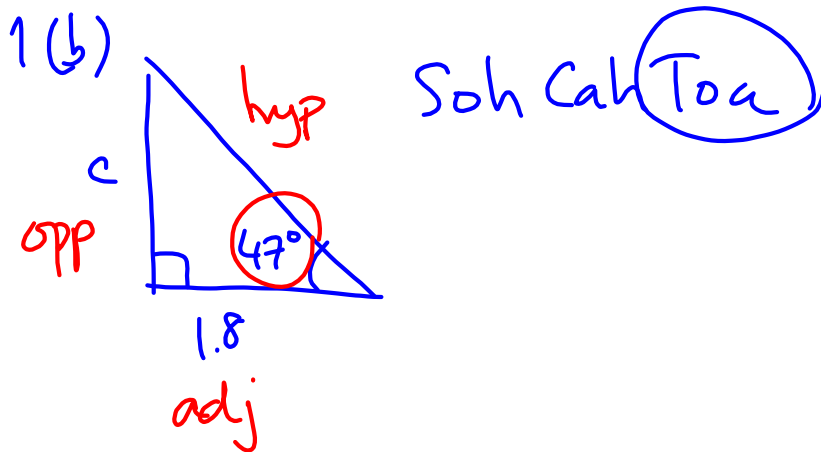
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{12}{\sin A} = \frac{b}{\sin B} = \frac{18}{\sin 130^\circ}$$

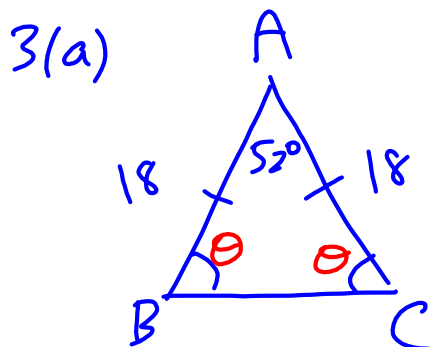
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Assigned Work:

p. 449 #1, 2, 3  
Worksheet



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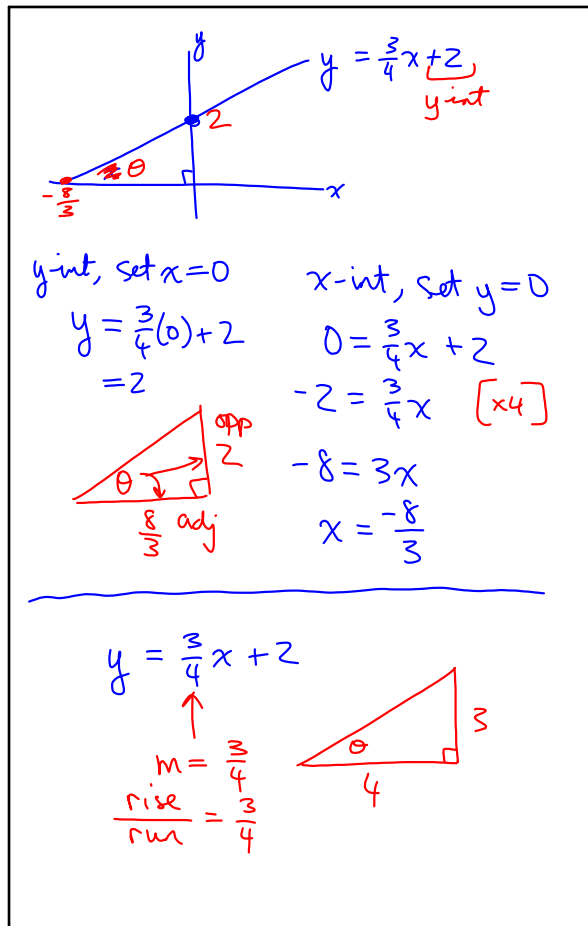
~~SSA~~ → Sine law  
 ✓ SAS → cosine law

$$\angle B = \angle C$$

$$\theta + \theta + 52^\circ = 180^\circ$$

$$2\theta = 128^\circ$$

May 24-1:59 PM



May 24-2:02 PM