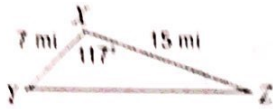


7.4N - Law of Sines

Starter: (Round answers to the nearest tenth.)

1. Find the area of the triangle.



$$A = .5 (7)(15) \sin 117$$

$$A = 46.8 \text{ mi}^2$$

3. Solve for x.

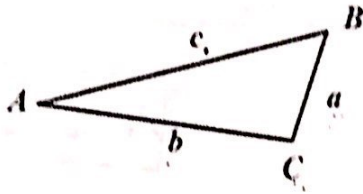
$$\frac{x}{8} = \frac{3}{7}$$

$$\frac{7x}{7} = \frac{24}{7}$$

$$x = \frac{24}{7}$$

A. Law of Sines -

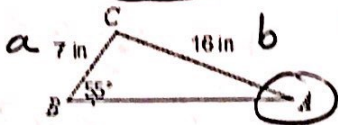
**Use when you have ASA, AAS, or SSA



Examples: Find each measurement indicated. Round your answers to the nearest tenth.

1. Find $m\angle A$

SSA



$$\frac{\sin A}{7} = \frac{\sin 55}{16}$$

$$\frac{16 \sin A}{16} = \frac{7 \sin 55}{16}$$

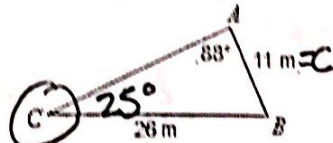
$$A = \sin^{-1} \left(\frac{7 \sin(55)}{16} \right)$$

$$A = 21^\circ$$

If finding an angle use \sin^{-1}

2. Find $m\angle C$

SSA



$$\frac{\sin C}{11} = \frac{\sin 88}{26}$$

$$\frac{26 \sin C}{26} = \frac{11 \sin 88}{26}$$

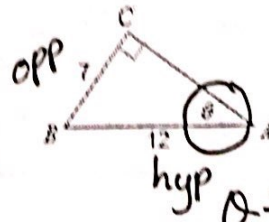
$$C = \sin^{-1} \left(\frac{11 \sin 88}{26} \right)$$

$$C = 25^\circ$$

Solve CAH TOA

$$\sin^{-1} \cos^{-1} \tan^{-1}$$

2. Find the measure of the angle indicated.



$$\sin \theta = \frac{7}{12}$$

$$\theta = \sin^{-1} \left(\frac{7}{12} \right)$$

$$\theta = 35.7^\circ$$

4. Solve for x.

$$\frac{2}{6} x = \frac{3}{1+7}$$

$$2(x+7) = 18$$

$$2x + 14 = 18$$

$$\frac{2x}{2} = \frac{4}{2}$$

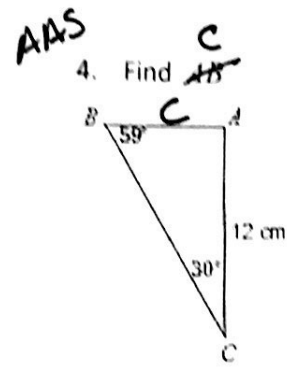
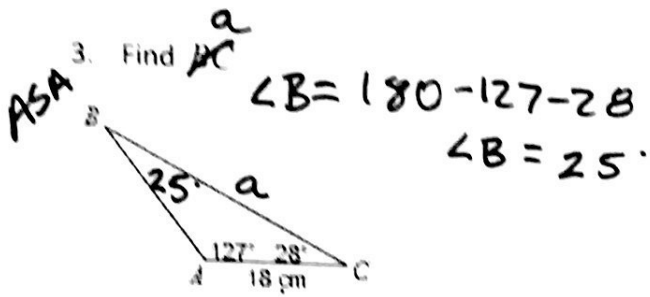
$$x = 2$$

Law of sines:

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

or

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



$$\frac{a}{\sin 127} = \frac{18}{\sin 25}$$

$$a \sin 25 = \frac{18 \sin 127}{\sin 25}$$

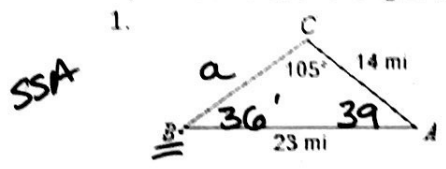
$a = 34 \text{ cm}$

$$\frac{C}{\sin 30} = \frac{12}{\sin 59}$$

$$\frac{C \sin 59}{\sin 59} = \frac{12 \sin 30}{\sin 59}$$

$C = 7 \text{ cm}$

Examples: Solve each triangle. Round your answers to the nearest tenth.



$m\angle A = 39^\circ$
 $m\angle B = 36^\circ$
 $a = 15 \text{ mi}$

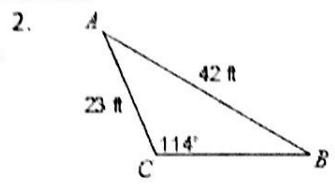
$$\frac{\sin B}{14} = \frac{\sin 105}{23}$$

$$23 \sin B = 14 \sin 105$$

Finding \angle so use \sin^{-1}

$$\angle B = \sin^{-1} \left(\frac{14 \sin 105}{23} \right)$$

$$m\angle B = 36^\circ$$



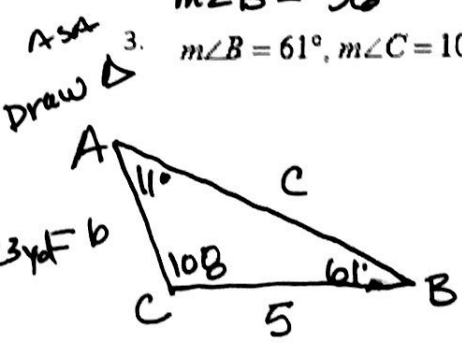
$$m\angle A = 180 - 105 - 36$$

$$m\angle A = 39^\circ$$

$$\frac{a}{\sin 39} = \frac{23}{\sin 105}$$

$$\frac{a \sin 105}{\sin 105} = \frac{23 \sin 39}{\sin 105}$$

$$a = 15 \text{ mi}$$



$m\angle A = 11^\circ$
 $b = 23 \text{ yd.}$
 $c = 25 \text{ yd.}$

$$\frac{b}{\sin 108} = \frac{5}{\sin 11}$$

$$\frac{b \sin 11}{\sin 11} = \frac{5 \sin 108}{\sin 11}$$

$b = 23 \text{ yd.}$

4. $m\angle C = 36^\circ, b = 19 \text{ m}, c = 20 \text{ m}$

$$m\angle A = 180 - 108 - 61$$

$$m\angle A = 11^\circ$$

$$\frac{c}{\sin 108} = \frac{5}{\sin 11}$$

$$\frac{c \sin 11}{\sin 11} = \frac{5 \sin 108}{\sin 11}$$

$$c = 25 \text{ yd}$$