

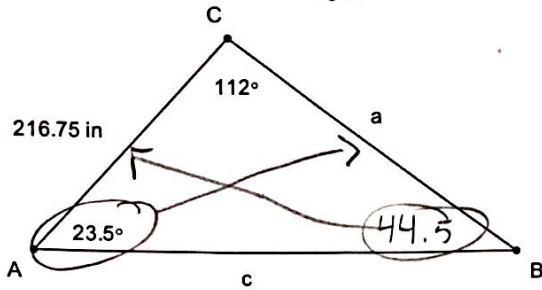
Name A: Answer Key
 Name B: _____

Round 2 dec.

Law of Sines and Cosines

1A Solve the triangle

$180 - 112 - 23.5$



$$\frac{\sin 23.5}{a} = \frac{\sin 44.5}{216.75}$$

$$\frac{216.75 \sin 23.5}{\sin 44.5} = \frac{a \sin 44.5}{\sin 44.5}$$

$$a = 123.3096281$$

$$\frac{\sin 112}{c} = \frac{\sin 44.5}{216.75}$$

$$c = \frac{216.75 \sin 112}{\sin 44.5}$$

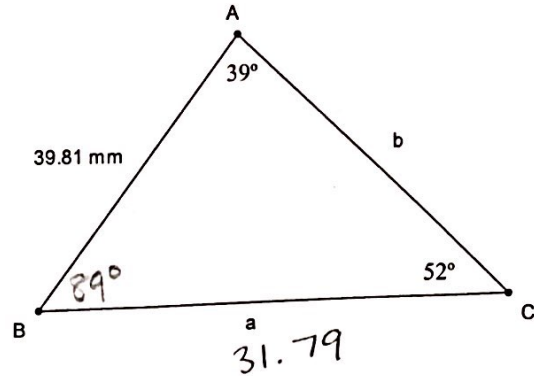
$\angle B = 44.5^\circ$

$a = 123.31$

$c = 286.72$

$c = 286.7234$

1B Solve the triangle



$$\frac{39.81}{\sin(52)} = \frac{a}{\sin(39)} \times \sin(39)$$

$$\frac{39.81 \sin(39)}{\sin(52)} = a \quad a \approx 31.79$$

$$\frac{39.81}{\sin(52)} = \frac{b}{\sin(89)}$$

$$\frac{39.81 \sin(89)}{\sin(52)} = b \quad b \approx 50.51$$

$\angle B = 89^\circ$

$a = 31.79$

$b = 50.51$

2A Explain:

If we know three angles of a triangle, we cannot find unique side lengths. Why?

need a side length to determine given lengths otherwise there are infinite possibilities.

2B Explain:

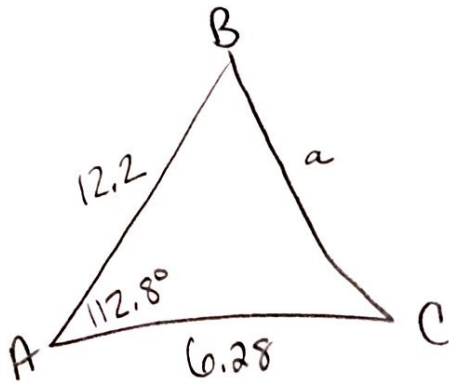
Can the law of sines be used to solve a triangle if we are given 3 sides of a triangle? Why or why not?

would have 2 variables

$$\frac{\sin A}{3} = \frac{\sin B}{4} = \frac{\sin C}{5}$$

3A Solve the triangle

$A=112.8^\circ, b = 6.28 \text{ m}, c = 12.2 \text{ m}$



$$a^2 = 12.2^2 + 6.28^2 - 2(12.2)(6.28)\cos 112.8^\circ$$

$$a^2 = 247.658$$

$$a = 15.7371$$

$$\frac{\sin C}{12.2} = \frac{\sin 112.8^\circ}{15.74}$$

$$\angle B = 21.58^\circ$$

$$\angle C = 45.62^\circ$$

$$a = 15.74$$

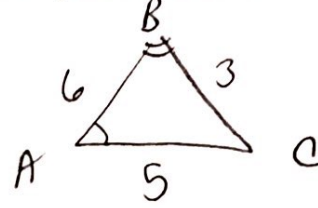
$$\sin C = .71466$$

$$m\angle C = 45.615$$

$$45.62^\circ$$

3B Solve the triangle

$a = 3 \text{ ft}, b = 5 \text{ ft}, c = 6 \text{ ft}$



$$3^2 = 6^2 + 5^2 - 2(6)(5)\cos A$$

$$\frac{(3^2 - 6^2 - 5^2)}{(-2 \cdot 6 \cdot 5)} = \cos A$$

$$m\angle A \approx 29.93^\circ$$

$$5^2 = 6^2 + 3^2 - 2(6)(3)\cos B$$

$$m\angle B \approx 56.25^\circ$$

$$\angle A = 29.93^\circ$$

$$\angle B = 56.25^\circ$$

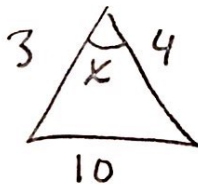
$$\angle C = 93.82^\circ$$

$$180 - 29.93 - 56.25 = 93.82^\circ$$

$$m\angle C \approx 93.82^\circ$$

4A Explain:

If you attempt to find any angle of a triangle with the values $a = 3, b = 4$ and $c = 10$ with the law of cosines, what happens?



* $3+4 \nless 10$
Need 2 smaller sides to add to be greater than the 3rd.

$$10^2 = 3^2 + 4^2 - 2(3)(4)\cos(x)$$

$$100 = 9 + 16 - 24\cos(x)$$

$$-25 \quad -9 \quad -16$$

$$\frac{75}{-24} = \frac{-24\cos(x)}{-24}$$

$$x = \cos^{-1}\left(\frac{75}{-24}\right) = \text{Error}$$

4B Explain:

How can you recognize which law you need to initially use when solving a triangle?

* Look for SSS or SAS = Law of Cosines

* Look for AAS or ASA for Law of Sines