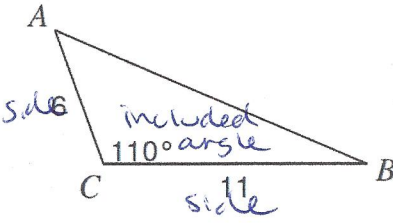
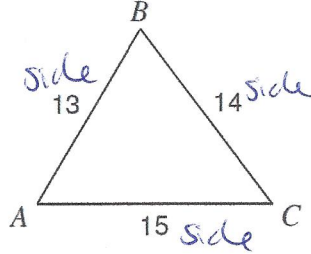


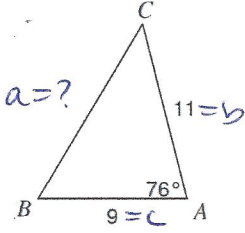
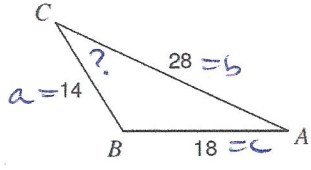
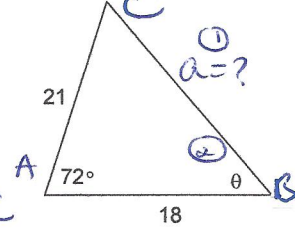
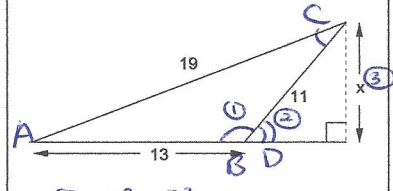
7.2 – Law of Cosines

Law of Cosines "Formulas" → 1.) $a^2 = b^2 + c^2 - 2bc \cdot \cos A$
 2.) $b^2 = a^2 + c^2 - 2ac \cdot \cos B$
 3.) $c^2 = a^2 + b^2 - 2ab \cdot \cos C$

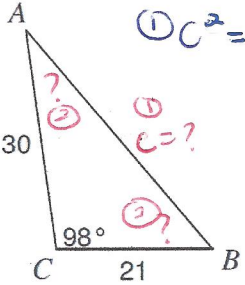
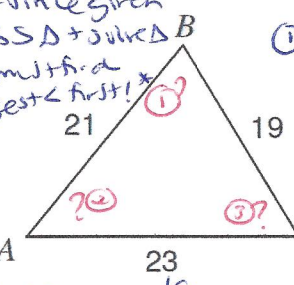
– Only use the Law of Cosines to solve a triangle if given the following:

Given Triangle # 1	Given Triangle # 2	Important when Solving w/ LOC
 <p>Type of Triangle: <u>SAS</u></p>	 <p>Type of Triangle: <u>SSS</u></p>	<ul style="list-style-type: none"> Given SAS triangle → FIRST find... the missing side of given angle Given SSS triangle → FIRST find... the largest angle which will be across from longest side Once used the Law of Cosines – May use Law of Sines because will be able to set up a proportion

Example 1: Find indicated side or indicated angle. Round to tenth place.

<p>a.) Find side a.</p>  $a^2 = 11^2 + 9^2 - 2(11)(9)\cos 76^\circ$ $\sqrt{a^2} = \sqrt{154.099464}$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">$a = 12.4$</div>	<p>b.) Find angle C.</p>  $18^2 = 14^2 + 28^2 - 2(14)(28)\cos C$ $324 = 980 - 784\cos C$ $-656 = -784\cos C$ $C = \cos^{-1}\left(\frac{-656}{-784}\right)$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">$C = 33.2^\circ$</div>	<p>c.) Find angle θ.</p>  $a^2 = 21^2 + 18^2 - 2(21)(18)\cos 72^\circ$ $\sqrt{a^2} = \sqrt{531.3831523}$ $a = 23.1$ $\frac{23.1}{\sin 72^\circ} = \frac{21}{\sin \theta}$ $\theta = \sin^{-1}\left(\frac{21 \sin 72^\circ}{23.1}\right)$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">$\theta = 59.8^\circ$</div>	<p>d.) Find side x.</p>  $x^2 = 19^2 + 13^2 - 2(19)(13)\cos 75.6^\circ$ $361 = 290 - 256\cos B$ $71 = -256\cos B$ $B = \cos^{-1}\left(\frac{-71}{256}\right)$ $B = 104.4^\circ$ $D = 180 - 104.4 - 75.6$ $D = 75.6^\circ$ $x = 10.7$
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Example 2: Solve each triangle. Round to tenth place.

<p>a.)</p>  $a^2 = 30^2 + 21^2 - 2(30)(21)\cos 98^\circ$ $\sqrt{a^2} = \sqrt{1516.358107}$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">$a = 38.9$</div> $\frac{38.9}{\sin 98^\circ} = \frac{21}{\sin A}$ $38.9 \sin A = 21 \sin 98^\circ$ $A = \sin^{-1}\left(\frac{21 \sin 98^\circ}{38.9}\right)$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">$A = 32.3^\circ$</div> $B = 180 - 98 - 32.3$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">$B = 49.7^\circ$</div>	<p>b.) * Since given SSS Δ + solve Δ B → multi. a largest \angle first!</p>  $23^2 = 19^2 + 21^2 - 2(19)(21)\cos B$ $529 = 802 - 798\cos B$ $-273 = -798\cos B$ $B = \cos^{-1}\left(\frac{-273}{-798}\right)$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">$B = 70^\circ$</div> $C = 180 - 70 - 50.9$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">$C = 59.1^\circ$</div> $\frac{23}{\sin 70^\circ} = \frac{19}{\sin A}$ $23 \sin A = 19 \sin 70^\circ$ $A = \sin^{-1}\left(\frac{19 \sin 70^\circ}{23}\right)$ <div style="border: 1px solid black; padding: 2px; display: inline-block;">$A = 50.9^\circ$</div>
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