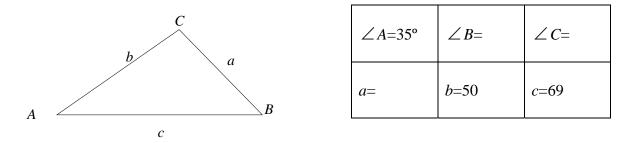
Solve Triangles (SAS): Solve for an Unknown Side

When you know two sides and an included angle of a triangle (SAS), you can use the Law of Cosines to solve for the other side. Consider the triangle ABC with the measures in the table.



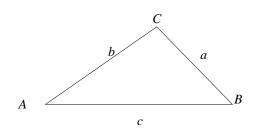
Since we know angle A we use $a^2 = b^2 + c^2 - 2bc \cos A$ from the Law of Cosines

$a^2 = b^2 + c^2 - 2bc\cos A$	Now use the Law of Sines to solve for
$a = \sqrt{b^2 + c^2 - 2bc\cos A}$	∠B.
$a = \sqrt{50^2 + 69^2 - 2(50)(69)\cos 35}$	$\frac{\sin B}{\sin A} = \frac{\sin A}{\sin A}$
$a \approx 40.1104836$	b a
	$\sin B = \sin 35$
$\int (50^2 + 69^2 - 2(50)) ($	$\frac{1}{50} - \frac{1}{40.1104836}$
69)cos(35)) 40.1104836	$\left(\left(\sin 25 \right) \right)$
48.1184030 Ans→X	$B = \sin^{-1} \left(50 \left(\frac{\sin 35}{40.1104836} \right) \right) \approx 45.64^{\circ}$
40.1104836	
	sin ⁻¹ (50(sin(35)/
	X)) 45.64284374 Ans→X
Note that we store that value in "x"	Ans→X
for our next computation.	43.64284374
for our next computation.	180-35-X 99.35715626
	And $\angle C \approx 99.36^{\circ}$

∠A=35°	∠ <i>B</i> ≈45.64°	∠ <i>C</i> ≈99.36°
<i>a</i> ≈40.11	<i>b</i> =50	<i>c</i> =69

Solve Triangles (SSS): Solve for an Unknown Angle

When you know three sides of a triangle (SSS), you can use the Law of Cosines to solve for an angle. Consider the triangles ABC with the measures in the table.



$\angle A =$	$\angle B =$	$\angle C =$
<i>a</i> =40	<i>b</i> =50	<i>c</i> =70

We can solve for angle A using $a^2 = b^2 + c^2 - 2bc \cos A$

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

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

$$\angle A = \cos^{-1} \left(\frac{b^{2} + c^{2} - a^{2}}{2bc} \right)$$

$$\angle A = \cos^{-1} \left(\frac{50^{2} + 70^{2} - 40^{2}}{2(50)(70)} \right)$$

$$\angle A \approx 34.05$$

$$\cos^{-1} \left(\frac{50^{2} + 70^{2} - 40}{2(50)(70)} \right)$$

$$\angle A \approx 34.05$$

$$\cos^{-1} \left(\frac{50^{2} + 70^{2} - 40}{34.04773237} \right)$$

Ans $\Rightarrow R$

$$34.04773237$$

Note that we store that value in for a later computation.

Cosines to solve for $\angle B$. We will use $b^2 = a^2 + c^2 - 2ac \cos B$ $\cos B = \frac{a^2 + c^2 - b^2}{2ac}$ $\angle B = \cos^{-1} \left(\frac{a^2 + c^2 - b^2}{2ac} \right)$ $\angle B = \cos^{-1} \left(\frac{40^2 + 70^2 - 50^2}{2(40)(70)} \right)$

Now we could use the Law of Sines or

 $\angle B \approx 44.42$ $\cos^{-1}((40^2+70^2-50^2))(2*40*70))(44.4153086^2)(44.4153086^2)(44.4153086^2))(44.4153086^2)(44.4153086^2)(44.4153086^2))(44.4153086^2)(44.4153086^2))(44.4153086^2)(44.4153086^2))(44.4153086^2)(44.4153086^2))(44.4153086^2)(44.4153086^2))(44.4153086^2))(44.4153086^2)(44.4153086^2))(44.4153086^2))(44.4153086^2))(44.4153086^2))(44.4153086^2))(44.4153086^2))(44.4153086^2))(44.4153086^2))(44.4153086^2))(44.4153086^2))(44.4153086^2))(44.4153086^2))(44.4153086^2))(44.4153086^2))(44.4153086^2))(44.4153086^2))(44.4153086^2))(44.4153086^2))(44.4153086^2))(44.41536959^2))(44.41536959^2))(44.41536959^2))(44.41536959^2))(44.41536^2$

 $\angle A \approx 34.05^{\circ}$ $\angle B \approx 44.42^{\circ}$ $\angle C \approx 101.54^{\circ}$ a = 40 b = 50 c = 70

"A"