Using the Law of Sines and the Law of Cosines to Solve Triangles

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1. If *SSS*

Given sides **a, b,** and **c**,
Use the *Law of Cosines* to determine m**A**.

* 1. Use the *Law of Cosines* to determine m**B**.
	2. Use the *sum of the angles of a triangle = 180* to find m**C**.
1. If *SAS*
	1. Given sides **a**and **b,** and **C**,
	Use the *Law of Cosines* to determine side **c**.
	2. Use the *Law of Cosines* to determine **B**.
	3. Use the *sum of the angles of a triangle = 180*to find m**A**.
2. If *ASA*
	1. Given m**A** and m**B** and side **c**,
	Use the *sum of the angles of a triangle = 180* to find m**C**.
	2. Use the *Law of Sines* to determine side **b**.
	3. Use the *Law of Sines* to determine side **a**.
3. If *AAS*
	1. Given m**A** and m**B** and side **a**,
	Use the *sum of the angles of a triangle = 180* to find m**C**.
	2. Use the *Law of Sines* to determine side **b**.
	3. Use the *Law of Sines* to determine side **c**.
4. If *SSA* (Ambiguous Case)
	1. Given sides **a**and **b,** and **A**,
	Use the *Law of Sines* to solve for sin **B**.
		1. If sin**B** > 1,
		There is **no** triangle.
		2. If sin**B**  1,
		Determine m**B** in quadrant I.
			1. If m**A** + m**B**  180
			There is **no** triangle.
			2. If m**A** + m**B** < 180
			There is at least one triangle.
				1. Determine m**B** in quadrant II.
				It has the same sine value as **B** .
				Call this angle, **B'**.
				2. Determine m**A** + m**B'**

If m**A** + m**B'**  180
There is only one triangle.

Determine m**C** using the *sum of the angles in a triangle = 180*

Determine side **c** using the *Law of Sines*.

If m**A** + m**B'** < 180
There are two triangles.

Determine m**C** using the *sum of the angles in a triangle = 180*

Determine side **c** using the *Law of Sines*.

Determine m**C'** using the *sum of the angles in a triangle = 180*

Determine side **c'** using the *Law of Sines*.