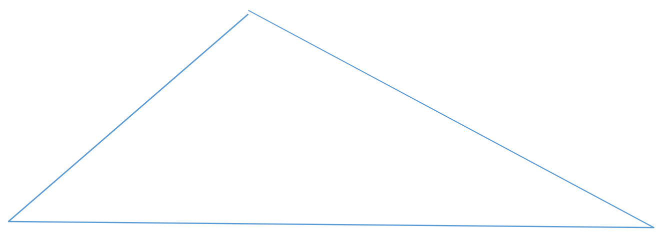
2.3 The Sine Law

The Sine Law is used to find angles and sides of non-right angled triangles

-use the sine law when you are **given** one angle and its opposite side

Ie:

The Sine Law:



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

Example 1: Find the missing side length:

a.) (AAS)

b.) (ASA)

Example 2: Determining an Unknown Angle Measure

a.) In ΔABC, $\angle A = 64°$, $a = 25.2$ cm and $b = 16.5$ cm. Determine the measure of $\angle B$ to the nearest degree

b.) In ΔABC, $\angle A = 36°$, $a = 23$ cm and $b = 33$ cm. Determine the measure of $\angle C$ to the nearest degree

Ambiguous Case

-The ambiguous case can exist if you are given two sides and the opposite angle of one of those sides:
SSA (side side angle)

There are three outcomes of the ambiguous case:

-no triangle exists

-one triangle exist

-two distinct triangles exist

To determine the ambiguous case, recall the following facts:

1. The sum of the angles is 180°

2. There can only be 1 obtuse angle

3. If $\sin\theta = a$ → for any positive value of *a*, θ can be in Quadrant I or Quadrant II

4. The ratio of sin: $-1 \leq \sin\theta \leq 1$

Example 3:

a.) In ΔABC, $a = 20$ cm and c$=23$ cm and $\angle A = 30°$. How many triangles can exist?

b.) In ΔABC, $a = 7$ cm and c$=16$ cm and $\angle A = 30°$. How many triangles can exist?

c.) In ΔABC, $a = 16$ cm and c$=10$ cm and $\angle A = 30°$. How many triangles can exist?