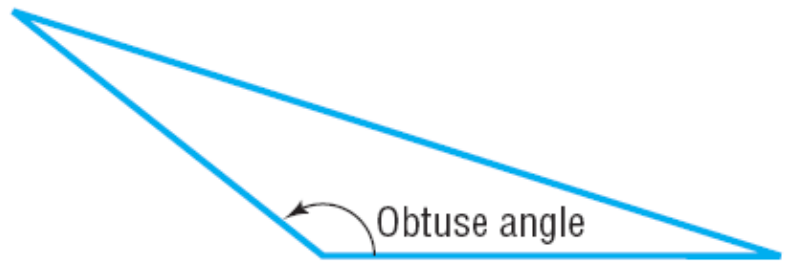




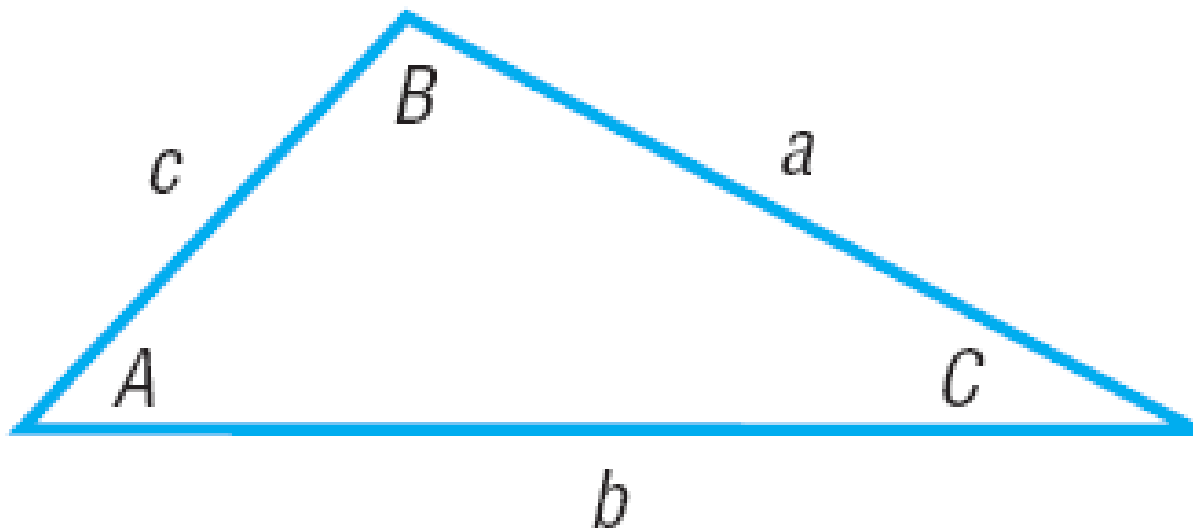
(a) All angles are acute



(b) Two acute angles and one obtuse angle

Oblique Triangle

(None of the angles is a right angle)



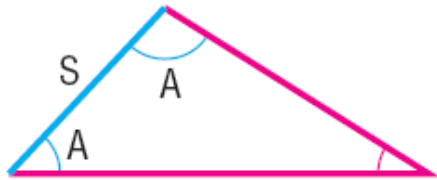
$$A + B + C = 180^\circ$$

CASE 1: One side and two angles are known (ASA or SAA).

CASE 2: Two sides and the angle opposite one of them are known (SSA).

CASE 3: Two sides and the included angle are known (SAS).

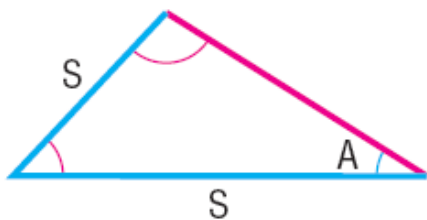
CASE 4: Three sides are known (SSS).



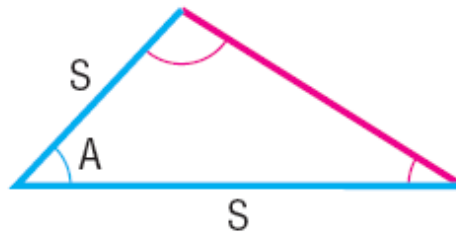
Case 1: ASA



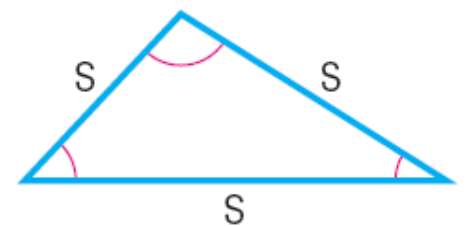
Case 1: SAA



Case 2: SSA



Case 3: SAS



Case 4: SSS

The **Law of Sines** is used to solve triangles for which Case 1 or 2 holds.

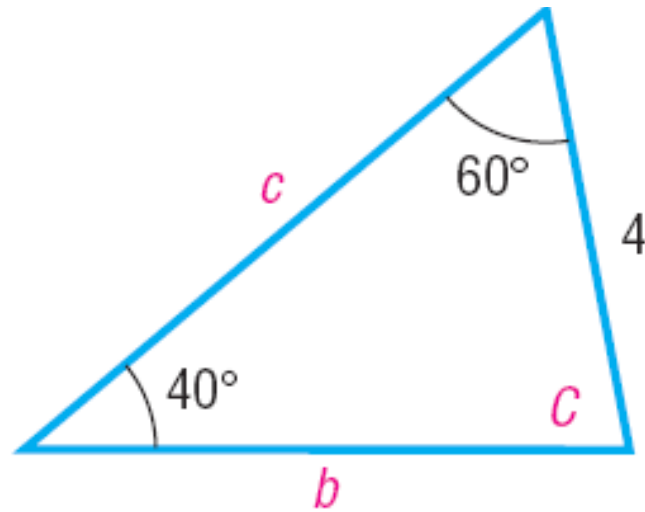
THEOREM

Law of Sines

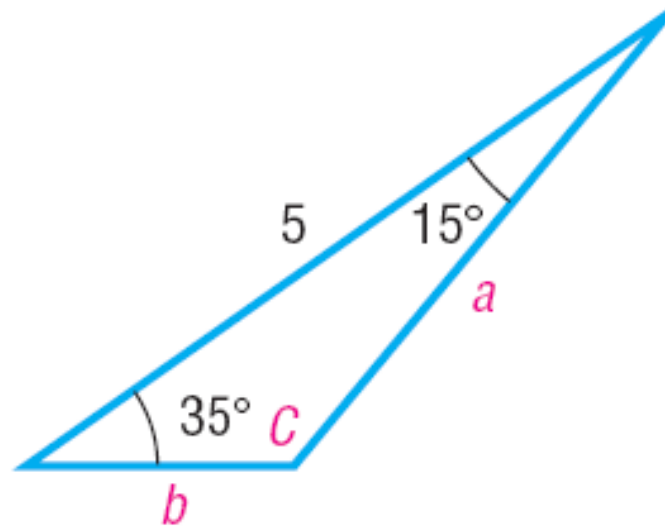
For a triangle with sides a, b, c and opposite angles A, B, C , respectively,

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c} \quad (1)$$

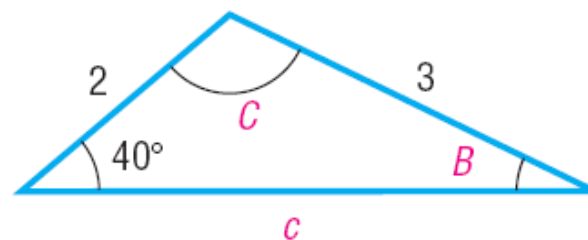
Solve the triangle: $A = 40^\circ$, $B = 60^\circ$, $a = 4$



Solve the triangle: $A = 35^\circ$, $B = 15^\circ$, $c = 5$



Solve the triangle: $a = 3$, $b = 2$, $A = 40^\circ$



Solve the triangle: $a = 6, b = 8, A = 35^\circ$

Solve the triangle: $a = 2, c = 1, C = 50^\circ$

Coast Guard Station Zulu is located 120 miles due west of Station X-ray. A ship at sea sends an SOS call that is received by each station. The call to Station Zulu indicates that the bearing of the ship from Zulu is $N40^\circ E$ (40° east of north). The call to Station X-ray indicates that the bearing of the ship from X-ray is $N30^\circ W$ (30° west of north).

- How far is each station from the ship?
- If a helicopter capable of flying 200 miles per hour is dispatched from the nearest station to the ship, how long will it take to reach the ship?

