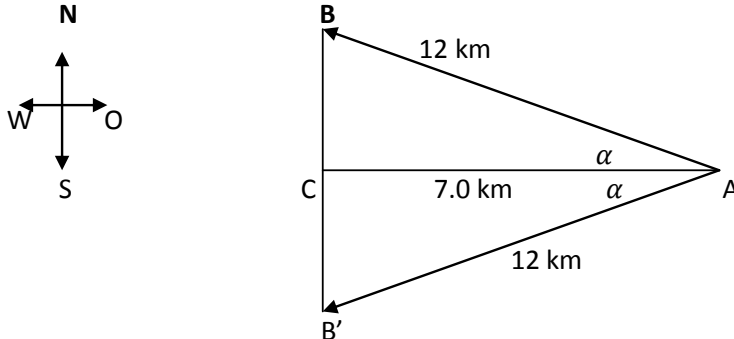A woman has hiked 12 km in a straight line and 7.0 km west of where she started determine two possible directions in which she hiked and her distance north or south of her starting position of each case.

Solution:

Triangles ABC and AB'C is equal.
From triangle ABC:

$$BC = \sqrt{(AB)^2 - (AC)^2} = \sqrt{12^2 - 7^2} = \sqrt{95} = 9.747 \; km$$
$$AC = ABcos\alpha$$
$$\alpha = \arccos\left(\frac{AC}{AB}\right) = \arccos\left(\frac{7}{12}\right) = 54.3°$$

Answer:
First possible direction is: Azimuth = $324.3°$ (270+54.3) North – North – West, distance of start position: 9.747 km on north.
Second possible direction is: Azimuth =$215.7°$ (270-54.3) South – South – West, distance of start position: 9.747 km on south.