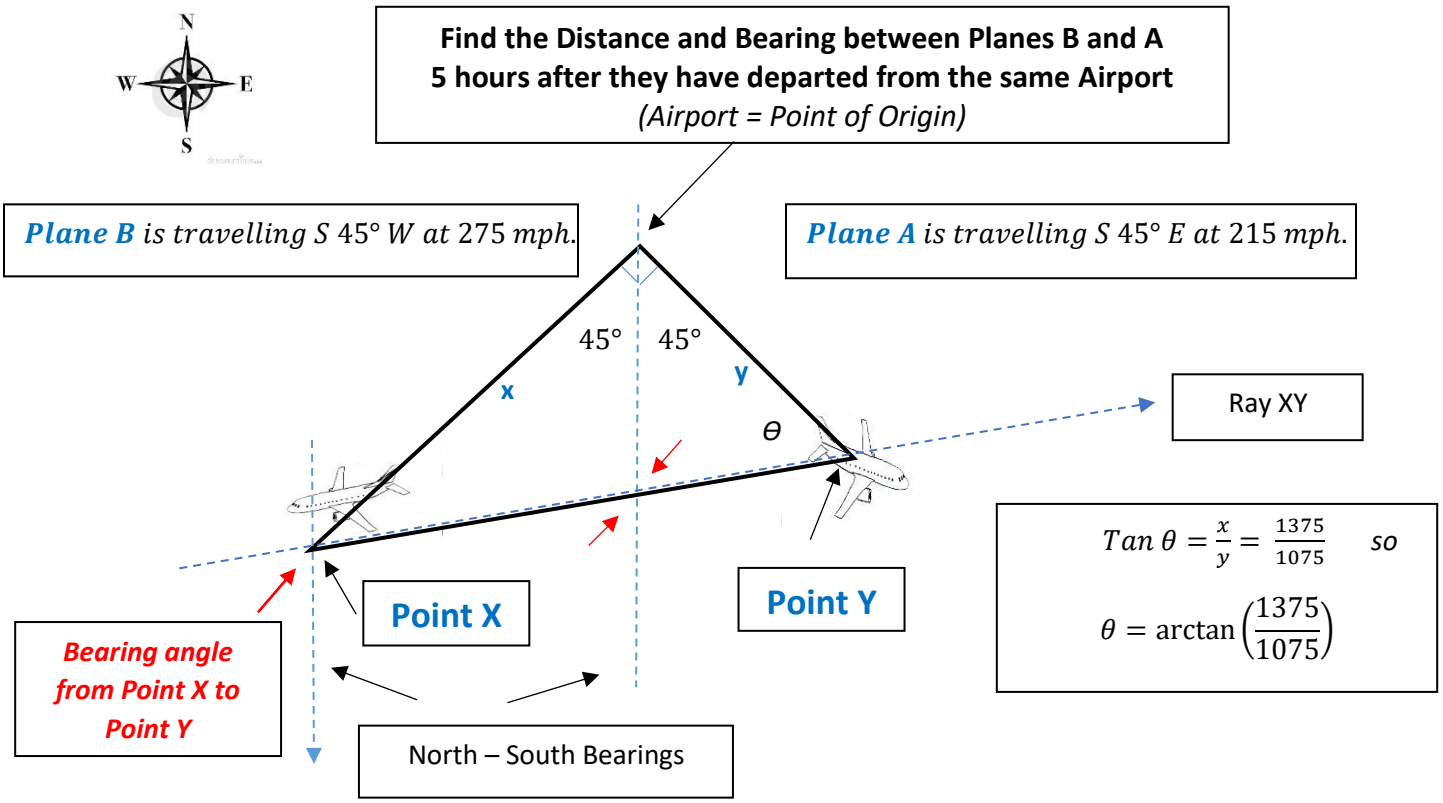
Distance and Bearing between 2 Airplanes

The US Army defines **the *bearing* from Point X to Point Y** as the ***angle between a ray in the direction of north or south*** ***(whose origin is Point X)*** ***and Ray XY*** ***(the ray whose origin is Point X and which contains Point Y.)*** The bearing consists of 2 characters and 1 number - First, the character is either N *(north)* or S *(south)*. Second is the angle value *(in degrees)*. Third, the character represents the direction of the angle away from the reference ray - thus, either E *(east)* or W *(west)*. **The angle value will always be less than 90 degrees**. For example, if Point Y is located exactly southeast of Point X, the bearing from Point X to Point Y is S 45° E.



A. **Find the distance between the two planes after 5 hours.** $(distance = rate \cdot time)$

$Plane\ A\ has\ travelled\ (215mph)(5\ hours) = 1075\ miles$

$Plane\ B\ has\ travelled\ (275mph)(5\ hours) = 1375\ miles$

$Distance \rightarrow \quad d = \sqrt{(1075)^2 + (1375)^2} = \mathbf{1745\ miles}$

B. **What is the Bearing from Plane B to Plane A after 5 hours?** S _____ W

$Bearing = 180° - 45° - \arctan\left(\frac{1375}{1075}\right) = 135° - 51.981° = 83.0°$

$So\ the\ \mathbf{Bearing\ from\ Plane\ B\ to\ Plane\ A} = \mathbf{S\ 83.0°\ W}$