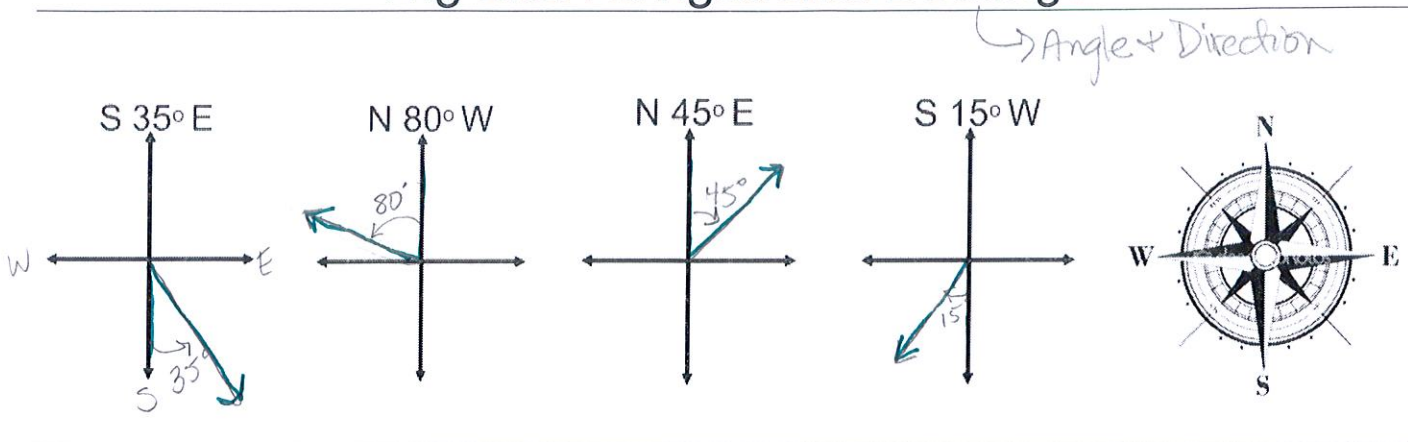


Trig and Navigational Bearings



Right Triangle Applications with Bearings

Example 1: A ship leaves port at noon and has a bearing of S 29° W. If the ship sails at 20 knots, how many nautical miles south and how many nautical miles west will the ship have travelled by 6:00pm?

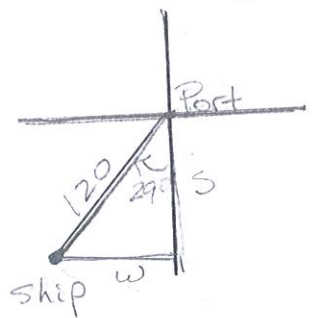
* nautical mile = a unit used in measuring distance at sea

"knot" → nautical mile per hour

1 knot = 2025 yards

noon to 6pm = 6 hrs

20 knots at 6 hrs → $\frac{20 \text{ nm}}{1 \text{ hr}} \cdot 6 \text{ hrs} = 120 \text{ miles}$



$$\cos 29 = \frac{S}{120}$$

$$120 \cos 29 = S$$

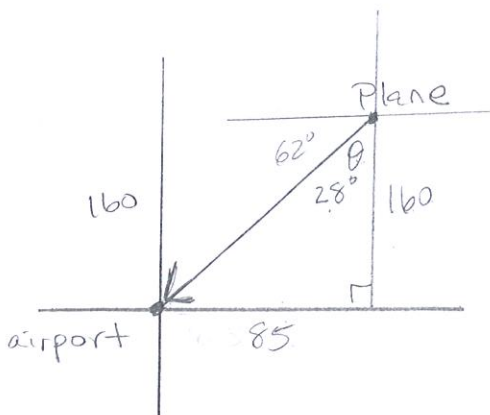
$$S = 104.95 \text{ n.m. South}$$

$$\sin 29 = \frac{W}{120}$$

$$120 \sin 29 = W$$

$$W = 58.18 \text{ n.m. West}$$

Example 2: A plane is 160 miles north and 85 miles east of an airport. If a pilot wants to fly directly to the airport, what bearings should be taken?



$$\tan \theta = \frac{85}{160}$$

$$\theta = \tan^{-1} \frac{85}{160}$$

$$\theta = 28^\circ$$

$$S \ 28^\circ \ W$$

or

$$W \ 62^\circ \ S$$