Trig and Navigational Bearings
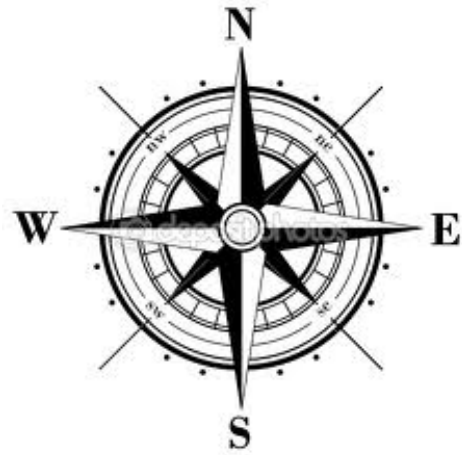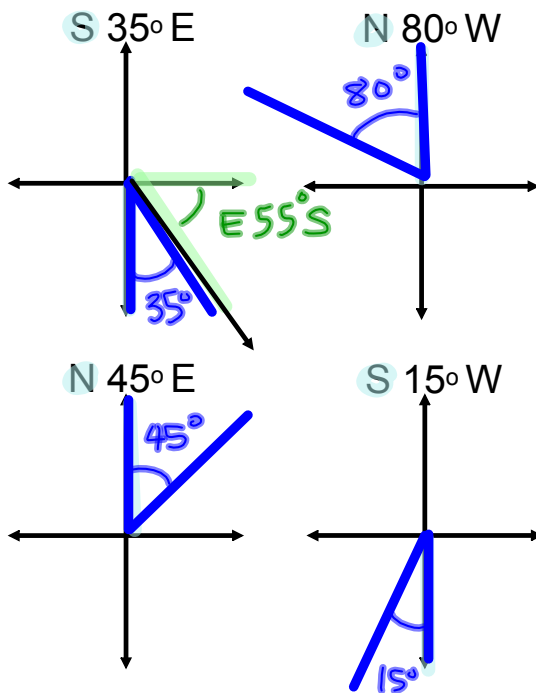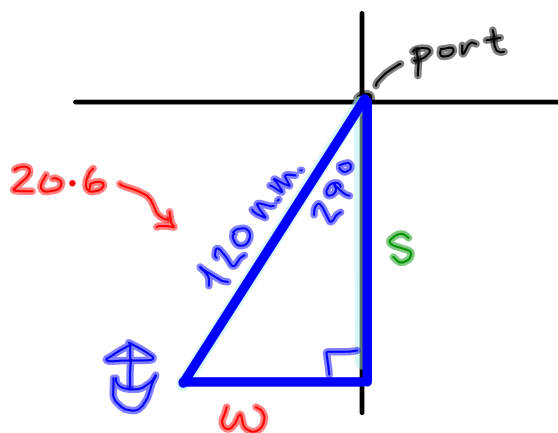
S 35° E

N 80° W

80°

E 55 S

35°

N 45° E

45°

S 15° W

15°

N

W   E

S

Right Triangle Applications with Bearings

<u>Example 1</u>: 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?

"knot" → nautical mile per hour

port

20.6

120 n.m.   29°
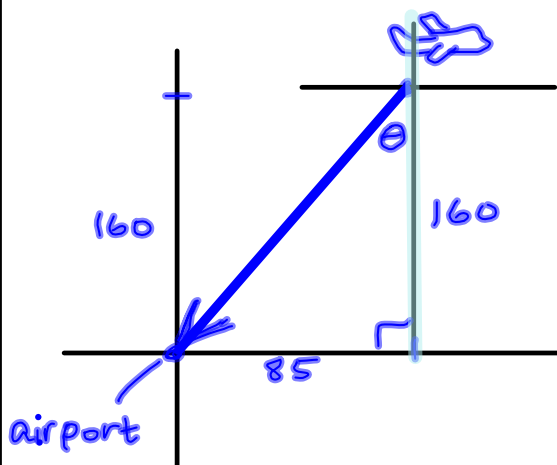
S

W

$$\cos 29° = \frac{S}{120}$$

$$(120 \cos 29° = S)$$

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

$$\sin 29° = \frac{W}{120}$$

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

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?

angle & direction

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

$$\theta = \tan^{-1}\left(\frac{85}{160}\right)$$

$$\theta = 28°$$

$$S\ 28°\ W$$

OR

$$W\ 62°\ S$$