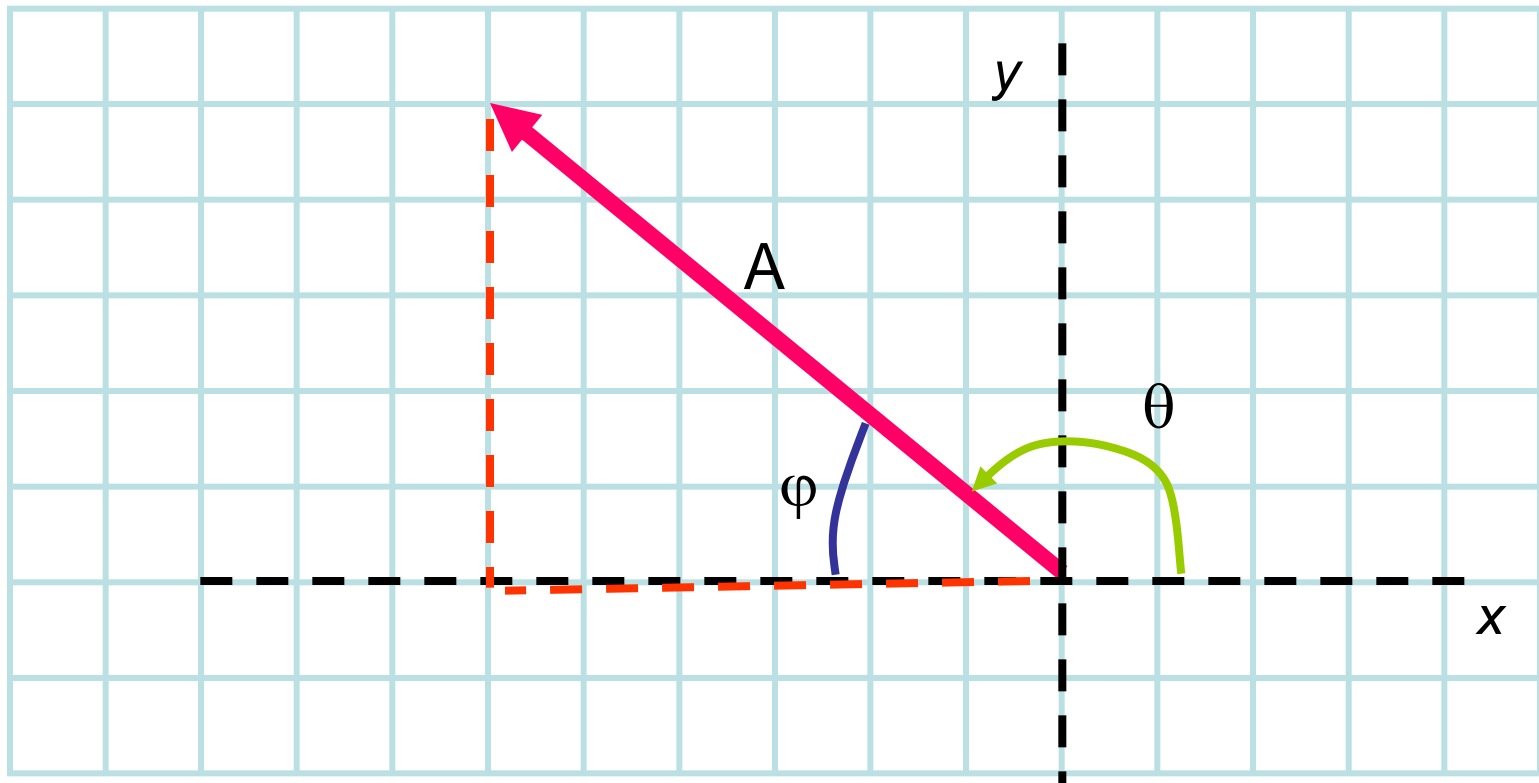


# Magnitude & Direction Notation

- Common
- Use Pythagorean Theorem & trig
- Direction means with respect to some convention
  - $0^\circ$  (positive x direction) in x-y axes
  - wrt nearest axis on maps (N, E, W, S)

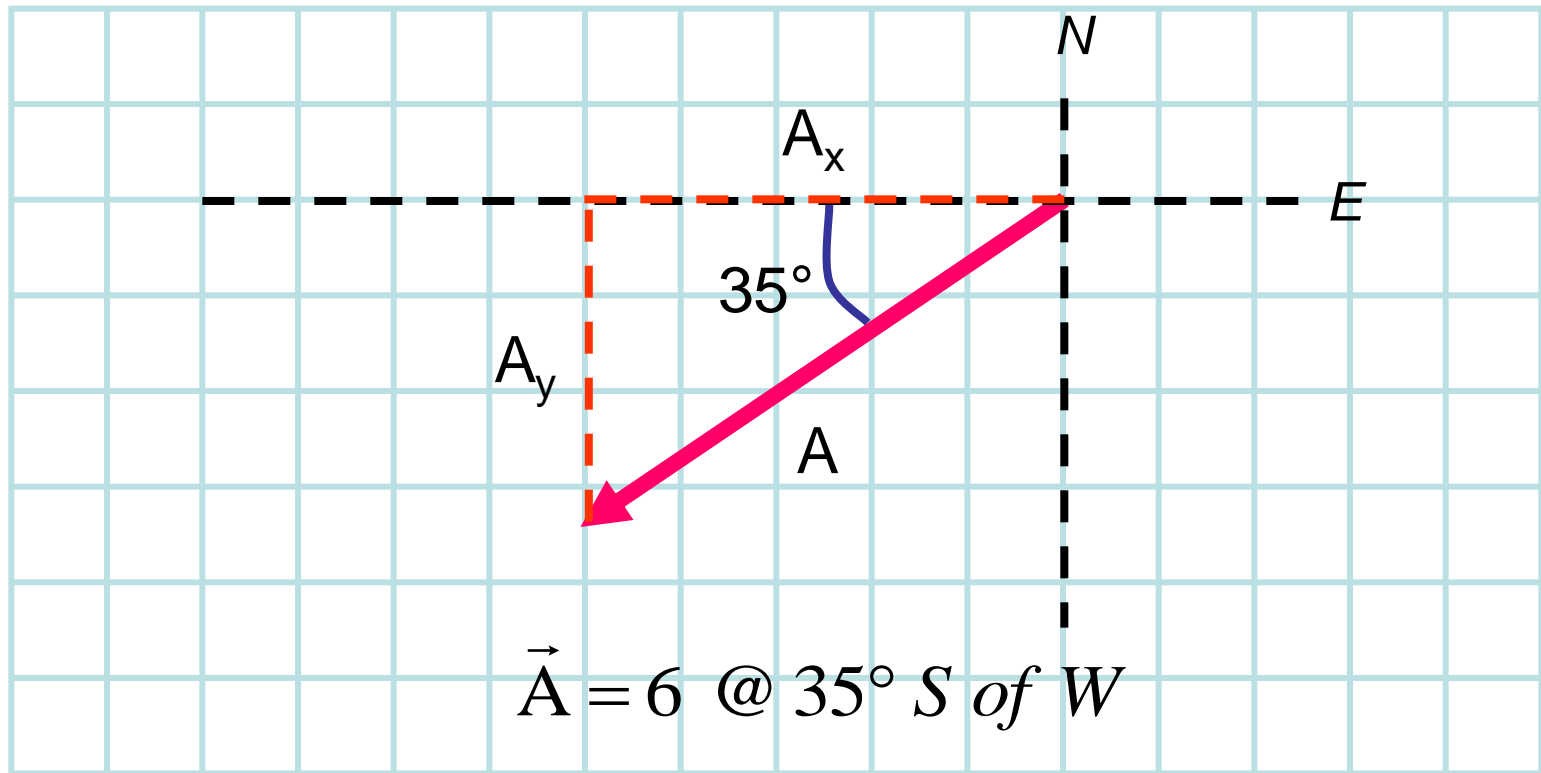


$$\vec{A} = -6\hat{i} + 5\hat{j}$$

$$A = |\vec{A}| = \sqrt{A_x^2 + A_y^2} = \sqrt{(-6)^2 + 5^2} = 7.81$$

$$\varphi = \tan^{-1}(\text{opp} / \text{adj}) = \tan^{-1}(5 / |-6|) = 39.8^\circ$$

$$\text{direction : } \theta = 180^\circ - \varphi = 140.2^\circ$$



$$A_x = 6 \cos 35^\circ = 4.91$$

$$A_y = 6 \sin 35^\circ = 3.44$$

$$\vec{A} = -\hat{i}4.91 - \hat{j}3.44$$