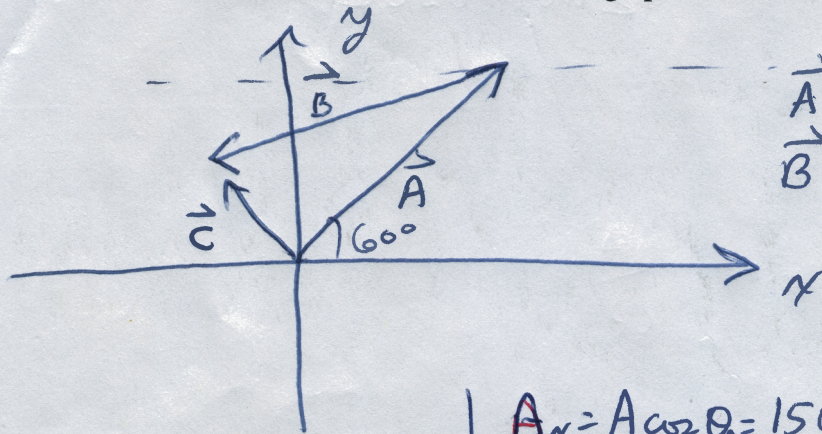


Problem 1: (20 pts.) A bicyclist travels 150 m at 60° North of East in 30 s, and then travels 200 m at 20° South of West in 40 s. Find the total displacement *vector* for the whole trip. You may express your answer either in terms of x and y components or in terms of magnitude and direction. *Hint:* First, draw a rough picture of the trip.

2. (20 pts.) A bicyclist travels 150m at 60° North of East in 30s, and then travels 200m at 20° South of West in 40s. Find the total displacement **vector** for the whole trip. You may express your answer either in terms of x and y components or in terms of magnitude and direction. *Hint:* First, draw a rough picture of the overall trip.



$$\vec{A} = 150 \text{ m} @ 60^\circ$$

$$\vec{B} = 200 \text{ m} @ 200^\circ$$

$$\vec{C} = \vec{A} + \vec{B}$$

$$A_x = A \cos \theta_A = 150 \cos 60^\circ = 75 \text{ m}$$

$$A_y = A \sin \theta_A = 150 \sin 60^\circ = 130 \text{ m}$$

$$B_x = B \cos \theta_B = 200 \cos 200^\circ = -188 \text{ m}$$

$$B_y = B \sin \theta_B = 200 \sin 200^\circ = -68.4 \text{ m}$$

$$C_x = 150 \cos 60 + 200 \cos 200 = 75 - 188 =$$

$$C_x = -113 \text{ m}$$

$$C_y = 150 \sin 60 + 200 \sin 200 =$$

$$= 129.9 + (-68.4) =$$

$$C_y = 61.5 \text{ m}$$

$$C = \sqrt{C_x^2 + C_y^2} = 129 \text{ m} @ 151^\circ$$

$$\tan \theta = C_y / C_x \Rightarrow \theta = 151^\circ$$

(Note: NOT -28.6° !)