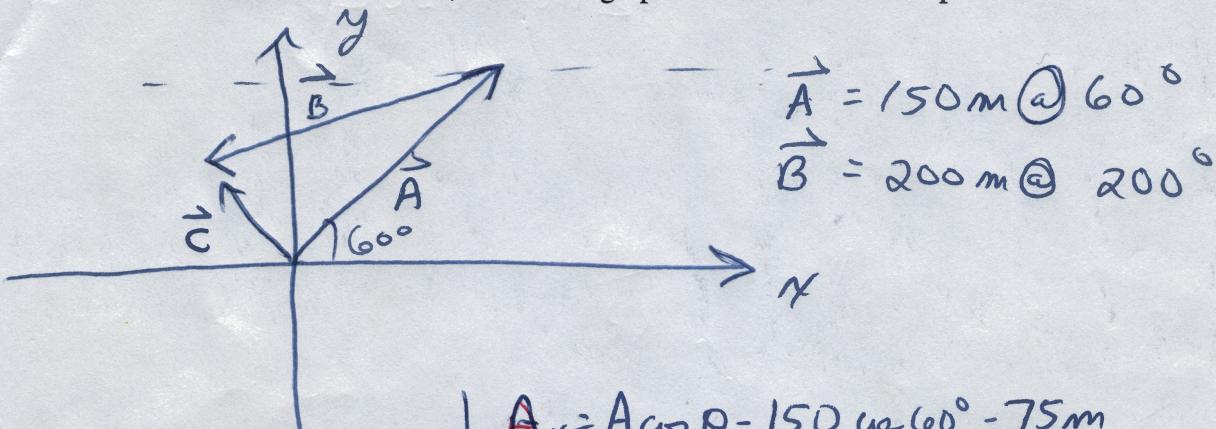


Problem 1: (20 pts.) A bicyclist travels 150 m at 60° North of East in 30 s, and then travels 200 m at 20° South of West in 40 s. Find the total displacement *vector* for the whole trip. You may express your answer either in terms of x and y components or in terms of magnitude and direction. *Hint:*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



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

$$\begin{aligned} A_x &= A \cos \theta_A = 150 \cos 60^\circ = 75 \text{ m} \\ A_y &= A \sin \theta_A = 150 \sin 60^\circ = 130 \text{ m} \\ B_x &= B \cos \theta_B = 200 \cos 200^\circ = -188 \text{ m} \\ B_y &= B \sin \theta_B = 200 \sin 200^\circ = -68.4 \text{ m} \end{aligned}$$

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

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

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

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

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

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

$$\tan \theta = \frac{C_y}{C_x} \Rightarrow \theta = 151^\circ$$

(Note: Not -28.6° !)