

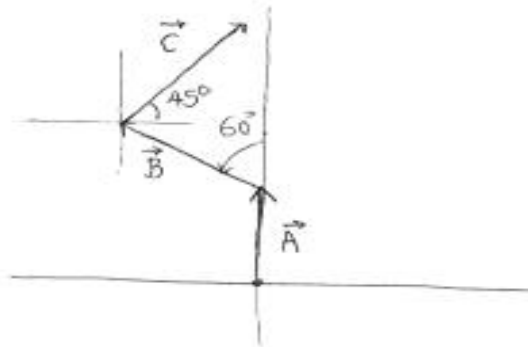
**Physics 101 Rec**  
**Quiz#2**  
**Chapter 3**

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Name: Key Id: \_\_\_\_\_ Sect: \_\_\_\_\_

A car travel 20 km due north, then 35 km in a direction  $60^\circ$  west of north, finally 60 km north of east.

- (a) Sketch the vector diagram for the car motion.



- (b) Find the x and y component of each displacement.

$$A_x = 0 \text{ km}$$

$$B_x = -35 \sin 60^\circ = -30.3 \text{ km}$$

$$A_y = 20 \text{ km}$$

$$B_y = 35 \cos 60^\circ = 17.5 \text{ km}$$

$$C_x = 60 \cos 45^\circ = 42.4 \text{ km}$$

$$C_y = 60 \sin 45^\circ = 42.4 \text{ km}$$

- (c) Find the magnitude and direction of the car's resultant displacement.

$$\begin{aligned} \vec{R} &= (A_x + B_x + C_x) \hat{i} + (A_y + B_y + C_y) \hat{j} \\ &= 12.1 \hat{i} + 80 \hat{j} \end{aligned}$$

$$|\vec{R}| = \sqrt{(12.1)^2 + (80)^2} = \boxed{81 \text{ km}}$$

$$\theta = \tan^{-1} \left( \frac{80}{12.1} \right) = \boxed{81.4^\circ}$$