

Physics 101Rec
Quiz#3
Chapter 4e

Instructor: Dr. A. Mekki

Name: Key Id: _____ Sect: _____

Car A is moving with a velocity of $2\hat{i} - 4\hat{j}$ relative to an observer on the ground. Car B is moving with a velocity of $-5\hat{i} + 3\hat{j}$ relative to an observer on the ground.

(a) What is the velocity of car B relative to car A?

$$\vec{v}_{AG} = 2\hat{i} - 4\hat{j}$$

$$\vec{v}_{BG} = -5\hat{i} + 3\hat{j}$$

$$\vec{v}_{BA} = \vec{v}_{BG} + \vec{v}_{GA} = \vec{v}_{BG} - \vec{v}_{AG}$$

$$= (-5\hat{i} + 3\hat{j}) - (2\hat{i} - 4\hat{j}) = -7\hat{i} + 7\hat{j}$$

(b) What is the speed of car B relative to car A?

$$|\vec{v}_{BA}| = \sqrt{2 \times 49} = 9.9 \text{ m/s}$$