

**Physics 220**  
**Exam 1**  
**Take home portion**

You are encouraged to discuss this material with your classmates but are required to do your own work.

Directions: Use your own words to demonstrate your understanding of the concepts. Direct quotes from the sources below are not acceptable unless they are followed by an interpretation in your own words. For each question, describe **in detail** as if you are talking with someone who has not taken this class. All answers must explain “how” and “why” they are true. I will not assume you understood if it’s not explicitly stated. All answers must be grammatically correct and typed, with the exception of any equations or diagrams.

1. Why is it necessary to give a number value and an angle when answering a question that asks for the velocity?
2. Explain how it’s possible that the steering wheel, brake pedal and gas pedal can legitimately be called “accelerators”.
3. A person wants to shoot an apple with an arrow. The trick is that their friend will drop the apple at the same exact moment that the arrow will be released. Both the apple and the arrow start at the same height. In what direction should the arrow’s initial velocity be in order to hit the apple? Include a diagram with your explanation.
4. Consider the yellow car rolling down the track on the right. Describe how the speed changes, the velocity changes, the acceleration changes and the position changes as it moves down the track.
5. For each of the above 4 problems identify any of the learning goals for [Exam 1](#) that apply.

