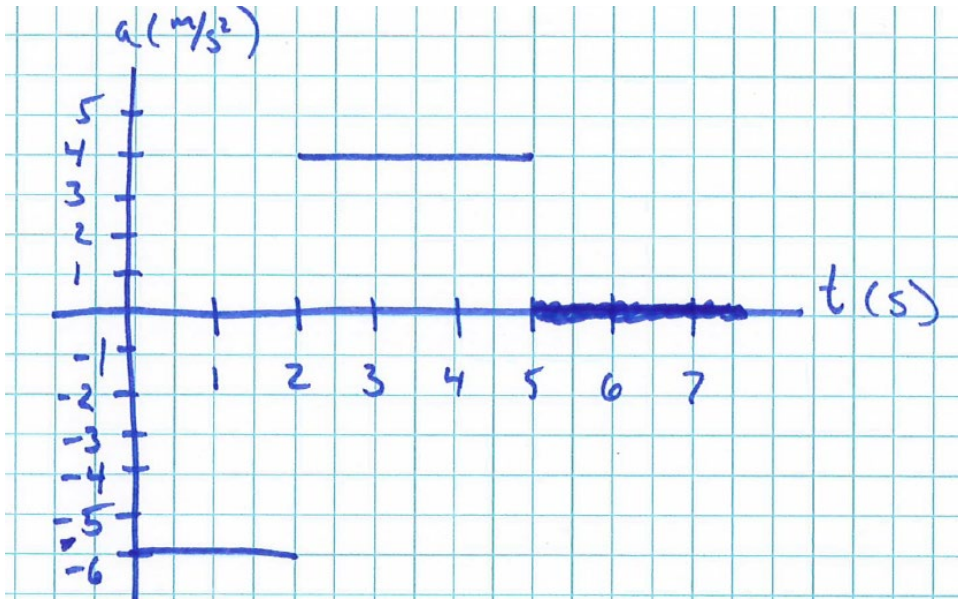


## Physics 105 Exam #1

### Translational motion (1&2D) with forces (1D).

Please write your answers on the paper provided and turn in your question sheet and note card with your answers. Make sure to include a clear explanation of your reasoning any relevant drawings and diagrams as I grade with partial credit. Good luck.

1. You are driving down the road at 20.0m/s (in the +x-direction) when you make the following maneuver:



- a. What is the range of speeds you experience during this maneuver?
  - b. How fast are you going at 7s into the maneuver?
2. A football is kicked from ground level with a speed of 35m/s at an angle of  $37.0^\circ$  up from the field. It isn't touched again before hitting the ground
    - a. How long will it be in the air?
    - b. How far away does it land?
  3. The vector  $\vec{E}$  is 4cm long and points  $40^\circ$  below the +x-axis. The vector  $\vec{G}$  is 7cm long and points  $30^\circ$  above the -x-axis. Find the vector  $\vec{F}$  in the equation  $\vec{E} = \vec{G} - \vec{F}$ .
  4. A person holds a basketball (mass 568g) still for 1s and then pushes it straight up in the air through a distance of 30cm to a speed of 8.50m/s. What are
    - a. average acceleration of the ball and
    - b. average force exerted by the person?
  5. Two children are fighting over a rag doll. One pulls on the head (475g) with a force of 9.7N. The other pulls on the body of the doll (825g) with a force of 7.2N. Previous experience with this doll shows that if the tension in the string holding the head to the body exceeds 9.0N the doll breaks (its head pops off). Please find:

- a. The acceleration of the doll if it doesn't break.
- b. The tension is in the string.
- c. If the doll going to break.