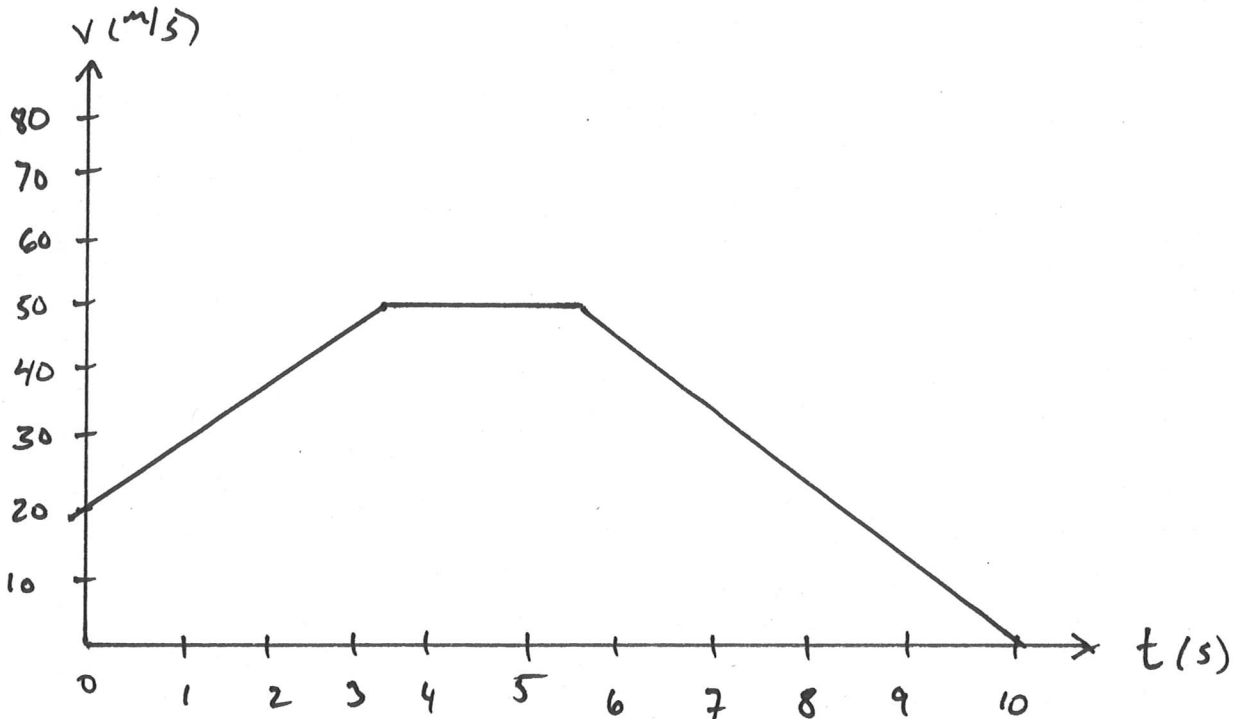


105 Practice
Physics ~~141~~ Exam #1
Translational motion with forces.

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. From the following velocity versus time graph for a car driving in a straight line please determine:
 - a. The acceleration of the object between 0 to 2s
 - b. The total change in position between 2 and 8s.
 - c. Describe the motion of the car in words from 0 to 8s. You may do this in terms of position, velocity, or acceleration as you see fit.



2. A squirrel needs to cross a creek and takes a running leap from a tree to try to do it. The branch that the squirrel leaps from just at the edge of the stream, 5m above the surface of the stream. He splashes down 4m across the stream and has to swim the rest of the way.
 - a. What was the squirrel's speed when he left the tree assuming he launched himself horizontally?
 - b. What was his velocity at impact?

3. You have two crates on wheels that you need to push from the loading dock of your apartment building to an elevator. One has a mass of 20kg the other 30kg. Because the wheels are well oiled there is essentially no resistance. You plan on pushing them one in front of the other pushing horizontally with the floor with a force of 40N.
 - a. Which order will cause there to be the largest force from the 20kg crate on the 30kg crate?
 - b. Calculate the force from the 20kg crate on the 30kg crate in this situation.
4. Vector \vec{A} is 10cm long and points 20° north of east. Vector \vec{B} is 15 cm long and points 30° west of north. Find the magnitude and direction of the vector $\vec{C} = \vec{A} - \vec{B}$. Clearly state which method you are using (graphical or algebraic) and support your result with work.
5. An electric vehicle starts from rest and accelerates at a rate of 2.0m/s^2 in a straight line until it reaches 20m/s. The vehicle then slows at a constant rate of 1.0 m/s^2 until it stops.
 - a. How much time elapses from start to stop?
 - b. How far does the vehicle travel from start to stop?