

g. Sketch a matching acceleration-time graph for this motion.

[4] A car travels 20 km toward an observer for 30 minutes. It then turns around and moves away from the observer for 50 km in 45 minutes. Calculate:

- a. _____ The displacement of the car over this time.
- b. _____ The average velocity of the car over the entire trip.
- c. _____ The average speed of the car over the trip.
- d. Sketch a position graph of the car's motion over time and label the slope(s).
- e. Sketch a velocity graph of the car's motion.
- [5] Sketch a velocity-time graph for a cart rolling down a ramp with consistently increasing acceleration.

- [6] A parachutist bails out and freely falls for 50 m. Then the parachute opens, and thereafter she decelerates at 2.0 m/s². She reaches the ground with a speed of 3.0 m/s.
- a. _____ How long is the parachutist in the air.

b. _____ At what height does the fall begin?

[7] The position of a soccer player is shown over time. From point 0 to 3 seconds, the position of the player is given by: $x = \frac{5}{2}$ mt (where "m" is a positive constant). From point 3 to 7 seconds, the

position of the player is given by $x = -mt^2 + \frac{15}{2}mt - 11m$.

a. _____ What is the average velocity of the player from 0 to 3 seconds, in terms of m?



b. _____ Based on the motion equation, how far is the player from the observer, initially?

- c. _____ Using the position equations, calculate when the soccer player reaches her furthest point from the observer, in terms of m.
- d. Sketch a corresponding velocity-time graph for this motion. Note any relevant slopes or intercepts.
- e. _____ From 0 to 7 seconds, when does the player reach the maximum velocity?
- f. Describe the motion from t=3 to 7 seconds.
- g. Sketch a matching acceleration-time graph for this motion over seven seconds.
- h. _____ Assume the player reaches a distance of 15 meters at t=3 seconds. Calculate m.

[8] A stone is thrown vertically upward. On its way up, it passes a point A with a speed V, and point B, 3.00 m higher than A, with a speed $(\frac{1}{2})$ V. Calculate...

a. _____ the speed V.

b. _____ The maximum height reached by the stone above point B.

[9] _____ The sport with the fastest moving ball is jai alai where measured speeds have reached 303 km/hr. If a professional jai alai player faces ball at that speed and blinks, he blacks out the scene for 100 ms. How far does the ball move during his blink?