

Problem Set #3 Graph Reading and 2D Kinematics
Due Friday September 14th

Name: _____

I worked with:

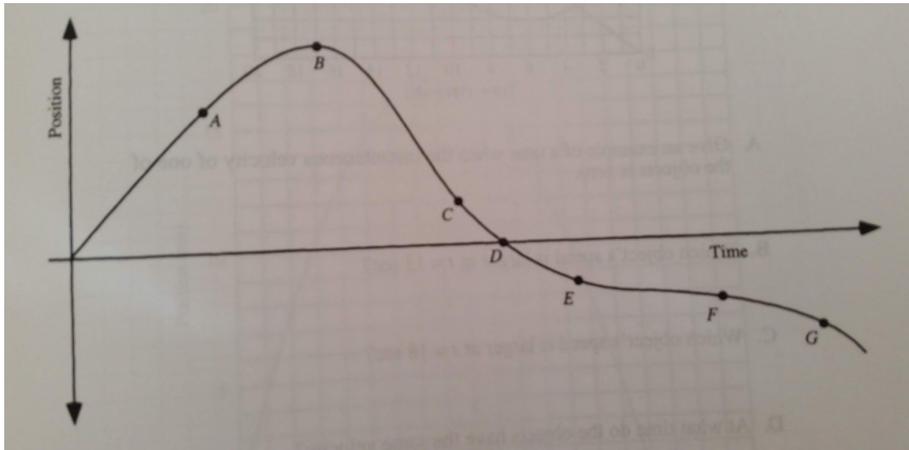
1. This weekend my family and I went out on a hike, we started by walking north 5.0 km at 6.0 km/h and then west 12 km at 5.0 km/hr. For my journey, determine...
 - a. The total distance of the entire trip
 - b. The total displacement of the entire trip
 - c. The average speed of the entire trip
 - d. The average velocity of the entire trip
 - e. The average acceleration of the entire trip

2. A soccer ball is kicked horizontally off the roof of HTHNC at a height of 20 meters by a student trying to kick the ball onto a spot on the ground located 25 meters from the base of the building. Ignore the effects of air resistance.
 - a. How long will it take for the ball to reach the ground?
 - b. At what velocity must the ball be kicked so that it lands inside of the circle?

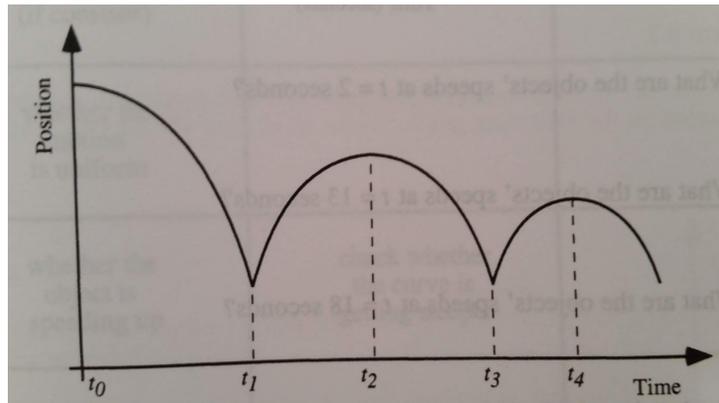
3. A projectile is fired at a 45° angle with an initial velocity of 50 m/s. Ignore air resistance.
 - a. What is the maximum height the projectile will reach
 - b. How long will it take to hit the ground?
 - c. A projectile can be fired at a maximum velocity of 40 m/s. There is a small hoop suspended 15 m above the ground.
 - d. At what angle must the projectile be fired so that the peak of the projectile's movement is at the same position as the hoop?
 - e. How much time will it take for the projectile to reach the hoop?
 - f. How far from the launch site will the projectile land
 - g. What will its total speed be upon landing?

4. At which of the lettered points on the graph below:
- Is the motion the slowest
 - Is the object speeding up?
 - Is the object slowing down?
 - Is the object turning around?

Explain your reasoning in each case



5. Using full sentences describe the motion shown by the position versus time graph below. Then sketch the velocity versus time graph that corresponds to the x versus t graph below. Sketch means draw the general shape of the graph without computing actual values.



6. Below is an acceleration versus time graph for a child on a ride at Disneyland. The child starts from rest.

- Plot a velocity versus time graph for the entire ride. Plot points every 2.5 seconds.
- How far did the child travel in the first 10 minutes?
- Did the child ever go backwards? If so, at what time, did the child reverse direction?
- Is the ride over at $t=50$ seconds? How can you tell?

