Name:_____

Solve the following problems in the space provided. Use the back of the page if needed. Each problem is worth 20 points. You <u>must</u> show your work in a logical fashion starting with the correctly applied physical principles. The equations you need are on the equation sheet. Your score will be maximized if your work is easy to follow because partial credit will be awarded.

1. The velocity of an object as a function of time is shown in the graph at the right. Answer the following questions about the object's motion. Be sure to explain your reasoning for full credit.
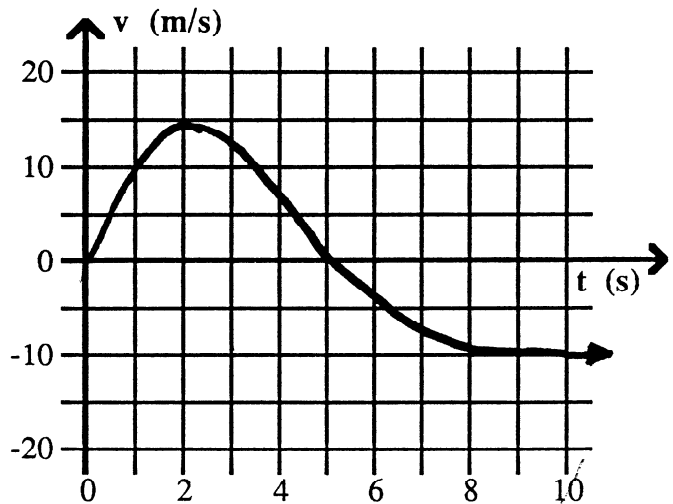
(a)When is the velocity a maximum?

(b)What is the maximum velocity?

(c)When is the velocity zero?

(d)When is the acceleration zero?

(e) When is the acceleration a maximum?

(f)What is the maximum acceleration?

(g)When is the object the farthest away from its starting point?

(h)How can you tell if the object will ever return to its starting point?

2. A hiker walks 5.00km northeast, then turns and walks 2.50km due south.   (a)Sketch first displacement, the second displacement, and the total displacement on the axes at the right. (b)Find the total distance traveled by the hiker. (c)Find the total displacement of the hiker.

N $\uparrow$ y

→ E
x
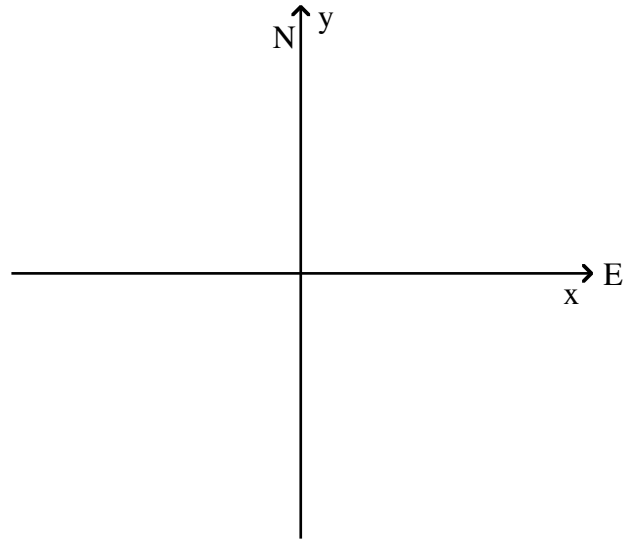
3. At the right is a table showing the acceleration due to gravity on Earth, the moon, and Mars. When astronauts landed on the moon they brought a golf ball. I suspect they will also bring one along when they go to Mars. Imagine identical golf balls thrown upward with identical initial velocities starting at identical heights on Earth, the moon, and Mars. Assume air resistance is negligible. Rank the balls from highest to lowest based upon the maximum height they will reach. You must explain your reasoning in terms of physical principles for full credit.

Body	g (m/s^2)
Earth	9.8
Moon	1.6
Mars	3.7

4. A squirrel running along a horizontal limb of an oak tree at 1.50m/s accidentally releases the acorn it was carrying. It strikes the ground 2.00s later. Find (a)the horizontal distance it traveled during the fall and (b)the height from which it was dropped.

5. The moon orbits Earth every 27.4 days and is 3.84×10^5 km away. Find (a)the speed and (a)the acceleration of the moon in its orbit.