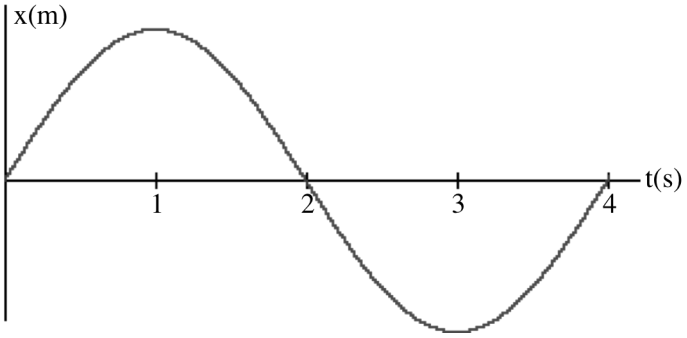
Name:_____

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

1. Using the graph of position versus time for an object shown at the right, estimate the time or times when the object



(a)is to the right of the origin,

(b)is to the left of the origin,

(c)is at the origin,

(d)has a positive velocity,

(e)has a negative velocity,

(f)has a velocity of zero,

(g)has a positive acceleration,

(h)has a negative acceleration,

(i)has a acceleration of zero.

(j)Find the total displacement of the object.

2. The vector $\vec{A}$ is 5.00m long and the vector $\vec{B}$ is 3.00m long.
   (a)Find the maximum length of $\vec{A} + \vec{B}$ and sketch this situation.
   (b)Find the minimum length of $\vec{A} + \vec{B}$ and sketch this situation.
   (c)Given that vector $\vec{A}$ is along the x-axis and $\vec{A} + \vec{B}$ is 7.00m long, find the angle that the vector $\vec{B}$ makes with the x-axis.

3. Water leaving a hose goes straight upward to a maximum height of 1.20m. Find the speed of the water as it leaves the hose.

4. A student works out the solution to a difficult physics problem on a piece of scratch paper. After copying the solution neatly to the page they will turn in they wad the scratch paper up and throw it horizontally into a 30.0cm high wastebasket 3.00m away. Find the speed they should throw it assuming that they release it 1.20m above the ground.

5. A television satellite must appear stationary in the sky so that the satellite dish doesn't have to move as it orbits. This means that the satellite completes precisely one orbit each day. The radius of the satellites orbit is 4.22×10^4km. Find (a)the speed of the satellite and (b)the acceleration of the satellite. (c)Your friend says that the answers to both questions must be zero since the satellite doesn't appear to move. Comment on their statement.