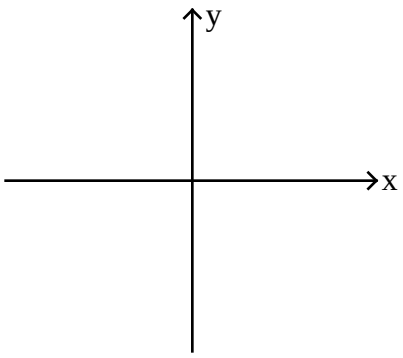
Name:_____

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. A hiker walks 2.50km northward then 5.00km southwest. Find (a)the total distance traveled by the hiker and (b)the total displacement of the hiker. (c)Sketch the three displacements on the axes at the right (+y = north and +x = east).



2. A ball is thrown upward and its height (y) as a function of time (t) is given by the equation, $y = 2.00 + 10.0t - 4.90t^2$ where y is in meters when t is in seconds. Find (a)the position of the ball at t = 2.00s, (b)the velocity of the ball at t = 2.00s and (c)the acceleration of the ball at t = 2.00s. (d)Find the maximum height of the ball.

3. The launch tower for the space shullte is approximately 100m tall. It takes the shuttle about 5.00s to clear this tower. (a)Estimate the acceleration of the shuttle and state any simplifying assumptions you use. (b)Find the velocity of the shuttle as it clears the tower.

4. A punter wants to kick a football so that it spends 4.00s in the air and travels 40.0m down the field. Find the horizontal and vertical components of initial velocity vector of the ball as it leaves the punter's foot.

5. The moon orbits Earth every 27.4days. Find (a)the speed of the moon in its orbit and (b)the acceleration of the moon. (c)A rock dropped from your hand accelerates toward the center of Earth due to gravity. Does the moon accelerate due to gravity? If so, in what direction? The effect of gravity on the rock causes it to fall toward Earth. Why doesn't the moon fall?