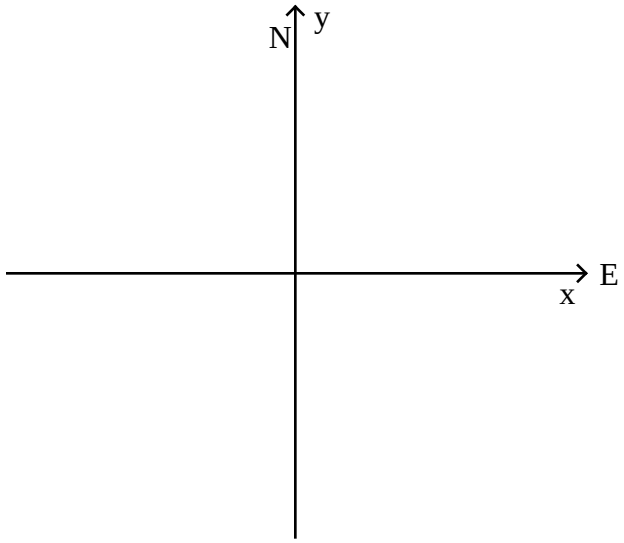
Name:_____

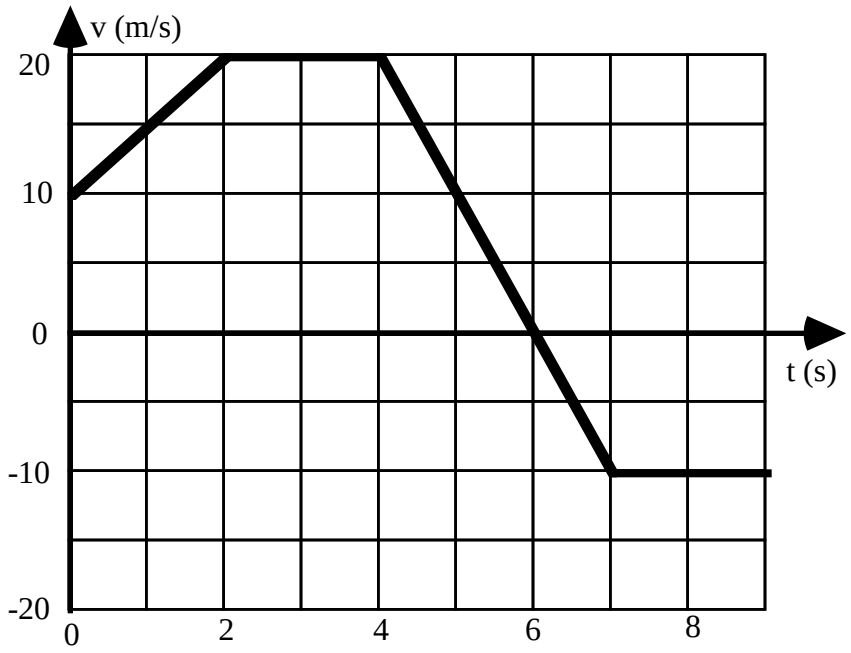
Solve the following problems in the space provided. Use the back of the page if needed. Each problem is worth 20 points. You must show your work in a logical fashion starting with the correctly applied physical principles which are on the last page. Your score will be maximized if your work is easy to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

1. An airplane flies from Timbucktu to Helenback by traveling due north for 1200km. The plane then flies on to Farnaway in a direction of 30˚ north of east for 1000km. Find the total displacement (magnitude and direction) between Timbucktu and Farnaway.



2. A water rocket accelerates uniformly from rest to 40.0m/s. During this acceleration the rocket travels 2.0m. Find the acceleration and time needed for this acceleration.

3. Answer the questions below by refering to the graph of velocity vs. time shown at the right.



(a)When is the velocity a maximum ?

(b)When is the velocity a minimum ?

(c)When is the velocity zero ?

(d)What is the maximum velocity ?

(e)What is the minimum velocity ?

(f)When is the acceleration have the largest positive value ?

(h)What is this maximum acceleration ?

(i)When is the acceleration zero ?

(j)When is the acceleration have the largest negative value ?

(k)What is this minimum acceleration ?

(l)When is the object the farthest from the starting point ?

(m)How far away is it at this point ?

(n)How far away from the starting point is the object after 9.0s ?

(o)What is the name of the key concept needed to answer the questions about position ?

(p)What is the name of the key concept needed to answer the questions about acceleration ?

4. A ball is thrown from the top of a 50.0m high cliff at an angle of 30˚ above the horizontal with a speed of 30.0m/s. Find the time of flight for the ball and the distance it lands from the base of the cliff.

5. A car traveling northward at 40.0km/hr rounds a curve that has a radius of 15.0m and is now headed east still at 40.0km/h. Find the magnitude and direction of the acceleration of the car when it is half way through the curve.