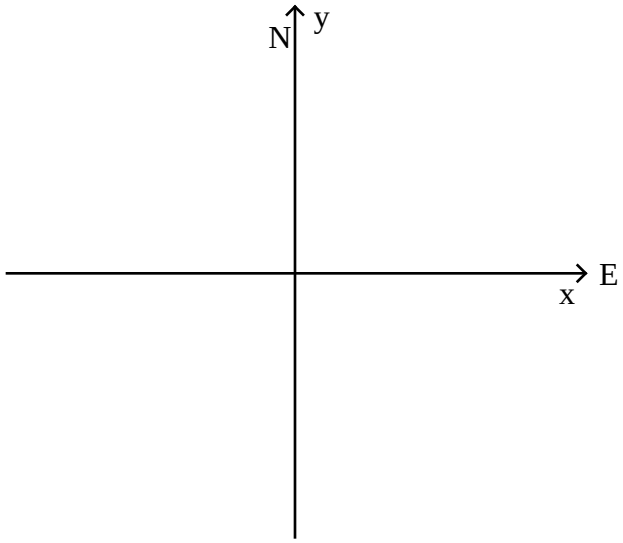
Name:_____

Physics 4A FIRST EXAM Chapters 1 - 4

Spring 1992

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 car traveling 80.0km/h eastward slows a bit and rounds a curve. Now it is going northeast with a speed of 60.0km/h. (a)Sketch the initial and final velocity vectors on the coordinate system below. (b)Express the velocity vectors in terms of unit vectors. (c)Sketch the change in the velocity vector, $\Delta\mathbf{v}$, and find its magnitude and direction.



2. A downhill skier starting at rest reaches a speed of 185km/h after traveling 150m along a hill. Find (a)the acceleration (assumed constant) and the time to cover this distance.

3. The position as a function of time for a car accelerating from a standing start is given by,

$$x = \alpha\, t^{\frac{5}{2}}$$

Find (a)the velocity as a function of time, (b)the acceleration as a function of time, (c)$\alpha$ given that the car reaches 30.0m/s in 8.00s, (d)the position of the car at t = 8.00s, and (e)the acceleration of the car at 8.00s.

4. A ball is thrown horizontally off the top of a building with a speed of 35.0m/s. It lands 50.0m from the base. Find (a)the time of flight and (b)the height of the building.

5. A 15.0m diameter Ferris Wheel turns at a constant rate of 0.700 revolutions per minute. Find the distance travelled by a passenger in one rotation, (b)the velocity (magnitude and direction) of the passengers when they are half way up, and (c)the acceleration (magnitude and direction) of the passengers when they are halfway up.