Physics 50 Mid-term exam Fall 2007 Name_____

1. (20 points) A package is to be dropped from a bridge a distance H above the ground. A car is traveling at constant velocity given as V_C toward the bridge. **Find the horizontal distance L the car would be at such that if the package is dropped at just the right time, it hits the car.**

2. (20 points) A speeding car moving at constant velocity given as V_c passes a police car at rest. After a given time of t' seconds, the police car accelerates with a given value of a_p from rest. **Find the distance the police car catches the speeding car with respect to where the speeding car first passed the police car.**

3. (20 points) Vector **A** is given as (12, 120°) and vector **B** is given as (4, 250°) and vector **C** is given as (13, 330°). **Find the resultant (in polar form) of 2A-3B+C.** Is it ok to plug numbers in early here as was done in the lecture.

4. (20 points) A projectile is fired horizontally toward a wall with a given initial velocity v_i. The wall is a given distance L away from where it is fired. By the time the projectile has actually hit the wall, it has traveled downward sucht that it strikes the wall a vertical distance below where it was aimed.
Find that vertical distance, D.

5. (20 points) A helicopter is traveling upward at a give speed of V_h. A package is dropped from the helicopter when it is a distance H above the ground. **Find the time it takes for the package to hit the ground.**