

make sure the answer is clearly displayed. Show the 7 steps (Goal, Given, Assumptions, Draw, Formulate Equations, Solve, Check) for full credit. You may use your textbook and notes to help you solve the problems.

### Question 1 (10 pts)

A 6 pound particle has following forces applied to it (the forces are in pounds):

$$F_1 = (2t + 6j - 2tk)$$

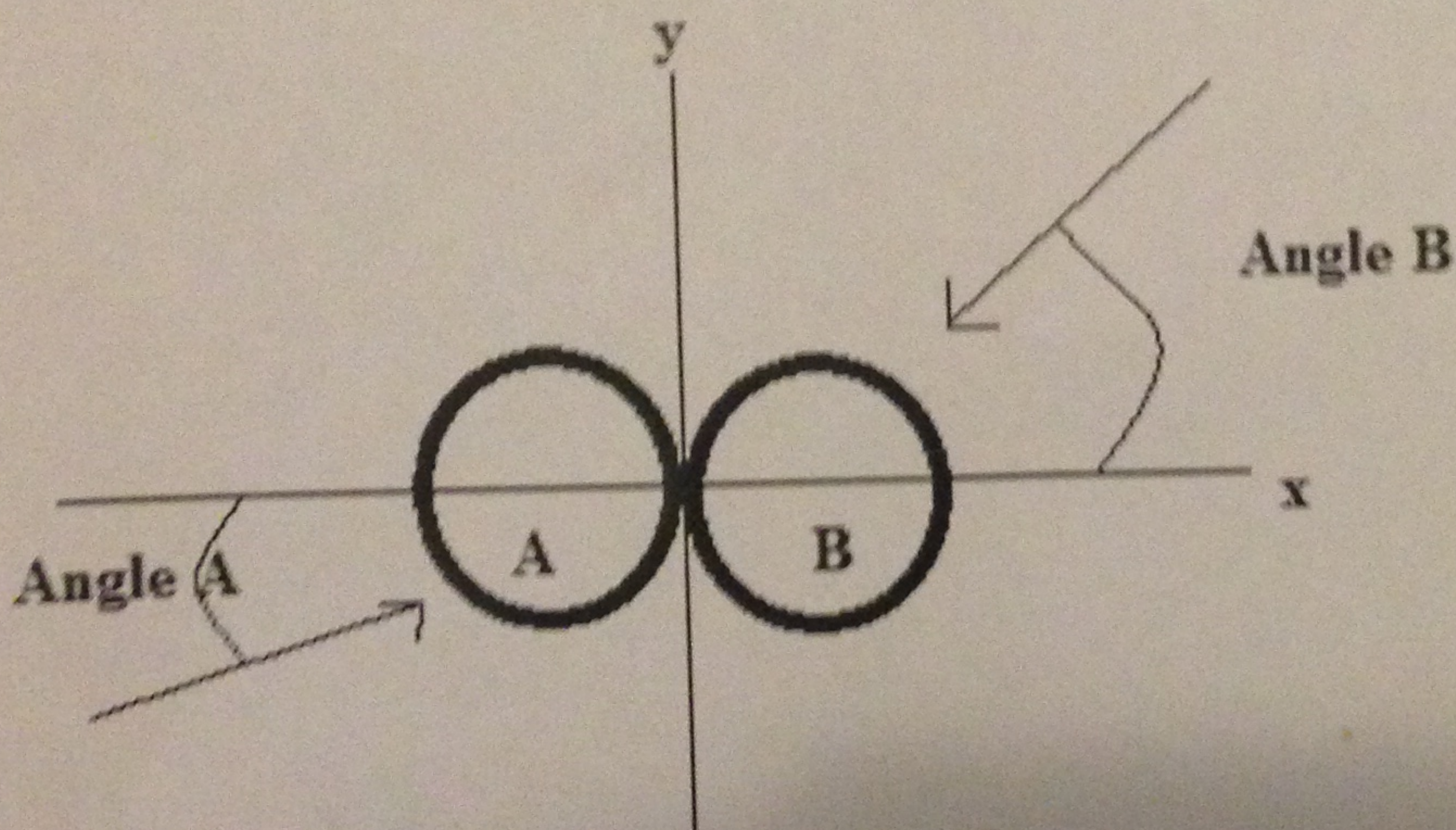
$$F_2 = (t^2i - 4tj - 1k)$$

$$F_3 = (-2ti)$$

If the particle is released from rest at the origin, where will it be in 2 seconds?

### Question 2 (10 pts):

Two disks moving on a frictionless surface collide as shown below. Angle A is 30 degrees, Angle B is 45 degrees. The velocity of A is 3m/s the velocity of B is 1m/s. The coefficient of restitution for the disks is 0.72, determine the final velocities of the disks, A and B, after the collision in both the x and y direction.



**Question 3 (5 pts with 5 pts Extra Credit):** A 10 kg ball is fired straight up (z direction) with an initial velocity of 50m/s determine the maximum height it will travel of atmospheric resistance is neglected. Extra Credit: determine the maximum height if the atmospheric resistance is  $F = (0.01 * v^2)$  N with v being the instantaneous velocity of the ball, measured in m/s.