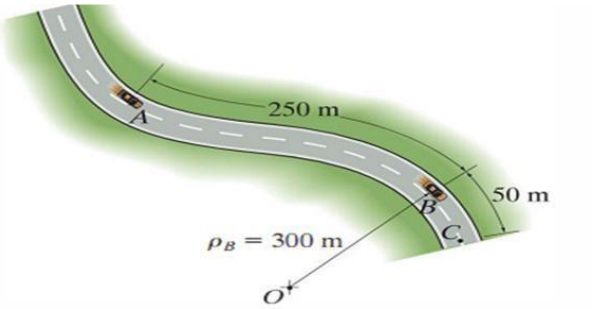
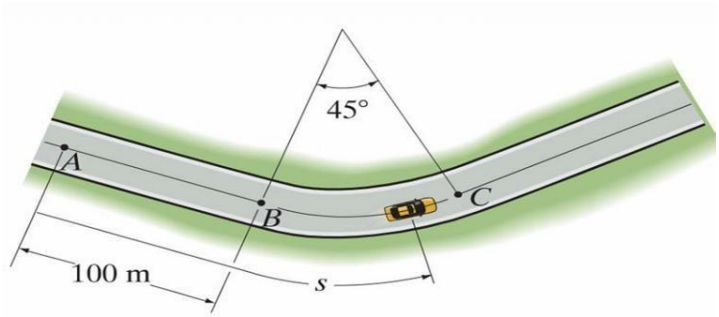
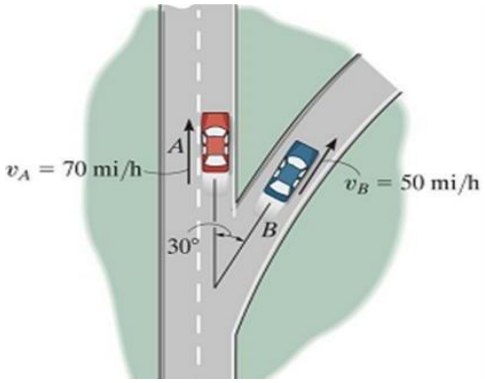
22. If the car decelerates uniformly along the curved road from **25 m/s at A to 15 m/s at C**, determine the acceleration of the car at B the distance from A to B **250m** and B to C is **50m**.



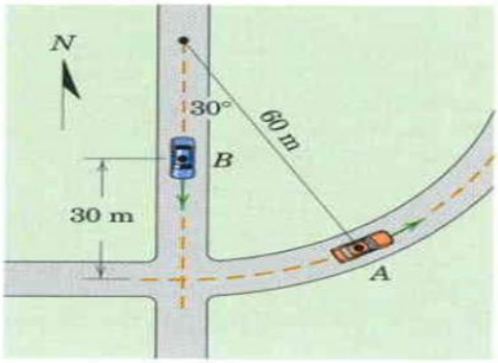
23. The car is traveling at a speed of **30 m/s**. The driver applies the brakes at A and thereby reduces the speed at the rate of $\mathbf{a_t = (-0.125t)\ m/s^2}$, where t is in seconds. Determine the acceleration of the car just before it reaches point C on the circular curve. It takes **15 s** for the carto travel from A to C.



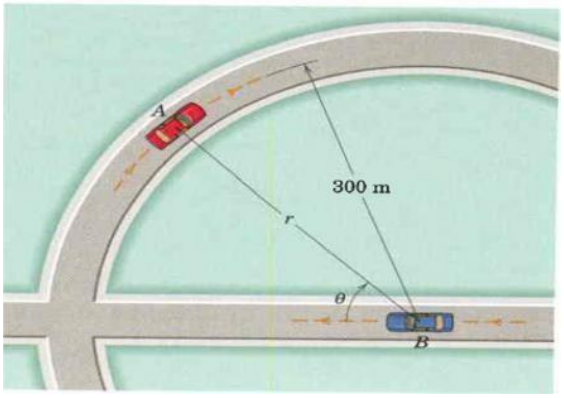
24. At the instant shown, cars A and B travel at speeds of **70 mi/h** and 50 **mi/h**, respectively. If B is decreasing its speed at **1400mi/h** while A is increasing its speed at 800 mi/h, determine the acceleration of B with respect to A. Car B moves along a curve having a radius of curvature of **0.7 mi**.



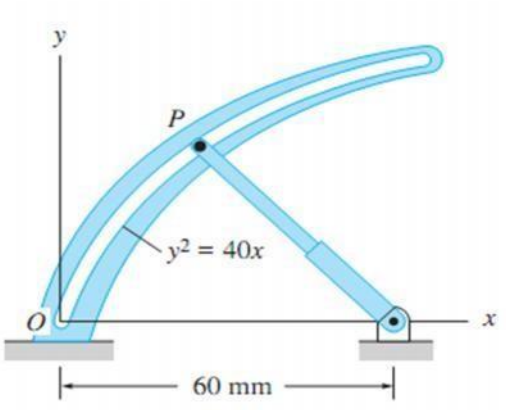
25. Car A negotiates a curve of **60-m** radius at a constant speed of **50 km/h**. when A passes the position shown, car B is **30 m** from the intersection and is accelerating south toward the intersection at the rate of **1.5 m/s^2**. Determine the acceleration which A appears to have when observed by an occupant of B at this instant.



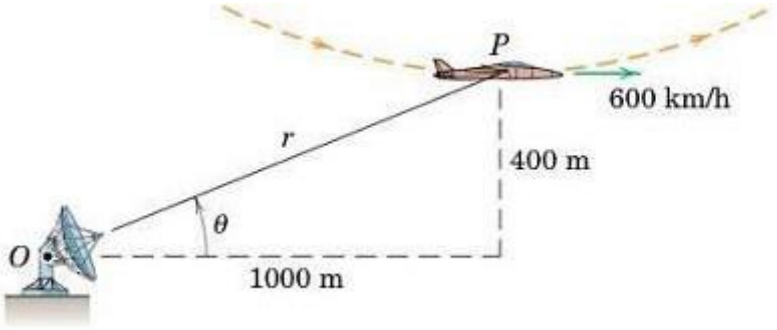
26. Car A is traveling at the constant speed of **60 km/h** as it rounds the circular curve of 300-m radius and at the instant represented is at the position **θ = 450.** Car B is traveling at the constant speed of **80 km/h** and passes the center of the circle at this same instant. Car A is located with respect to car B by polar coordinates r and θ with the pole moving with B. for this instant determine $V_{A/B}$ and the values of r and θ as measured by an observer in car B.



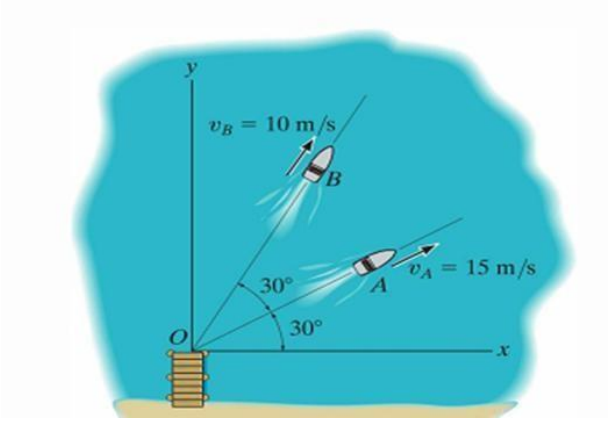
27. Pin P at the end of the telescoping rod in Fig. (a) Slides along the fixed parabolic path $\mathbf{y^2 = 40x}$, where x and y are measured in millimeters. The y coordinate of P varies with time t (measured in seconds) according to $\boldsymbol{y = 4t^2+6t}$ **mm**. When **y = 30 mm**, compute (1) the velocity vector of P; and (2) the acceleration vector of P.



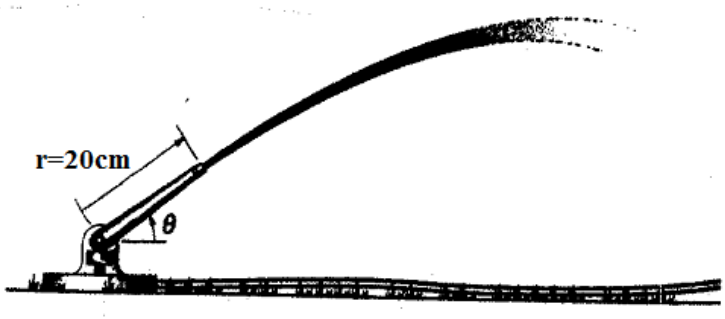
28. At the bottom of a loop in the vertical (r- θ) plane at an altitude of 100m, the airplane P has a horizontal velocity of **600km/h** and no horizontal acceleration. The radius of curvature of the loop is **1200m**. For the radar tracking at O, determine the recorded values of r and Θ for this instant.



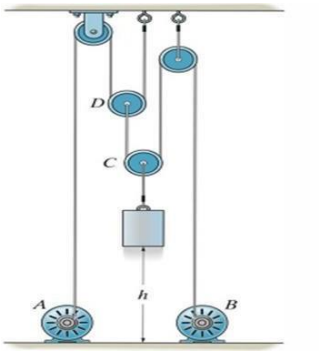
29. The boats A and B travel with constant speeds of $\mathbf{V_A = 15\ m/s}$ and $\mathbf{V_B = 10\ m/s}$ when they leave the pier at o at the same time. Determine the distance between them when **t = 4 s**.



30. The water sprinkler is rotating with an angular speed $\dot{\theta} = 114.6\ \text{deg/sec}$ and an angular acceleration $\ddot{\theta} = 172\ \text{deg/sec}^2$. If the nozzle lies in the vertical plane and water is flowing through it at a constant rate of 3 m/s, determine the magnitude of the velocity and acceleration of water particle as it exits the open end , r =20cm.



31. If motors at **A** and **B** draw in their attached cables with an acceleration of **a = (0.2t) m/s^2** where t is in seconds, determine the speed of the block when it reaches a height of h = 4 m, starting from rest at **h = 0 .** Also, how much time does it take to reach this height?



32. Determine the speed of car A if point P on the cable has a speed of **4 m/s** when the motor M winds the cable in.

