

Problem 1. A balloon is inflating. When its radius is 3m and its radius is increasing at a rate of 2m/s, how fast is its volume increasing? (Given formula: the volume of a ball is $V = \frac{4}{3}\pi r^3$)

Problem 2. A stick of length 10 leans on the corner of a wall and starts sliding down. When its top is moving down at speed 2 and its distance to ground is 6, how fast is its bottom moving?

Problem 3. A balloon is inflating. When its surface area is 2 and increasing at a rate of 5, how fast is its radius increasing? (Given formula: the surface area of a ball is $S = 4\pi r^2$)

Problem 4. A scientist is taking a video of a rabbit. The rabbit is running on a straight line, and the scientist has distance 6m from the line. When the rabbit has distance 10m from the scientist and is running at 7m/s, how fast does the scientist need to rotate the camera?

Problem 5. A point A is moving on the x -axis, and a point B is moving on the y -axis. At a given time, A is at $(4, 0)$, moving towards right with speed 3; B is at $(0, 3)$, moving towards bottom with speed 2. Are A and B getting closer or farther at this time?