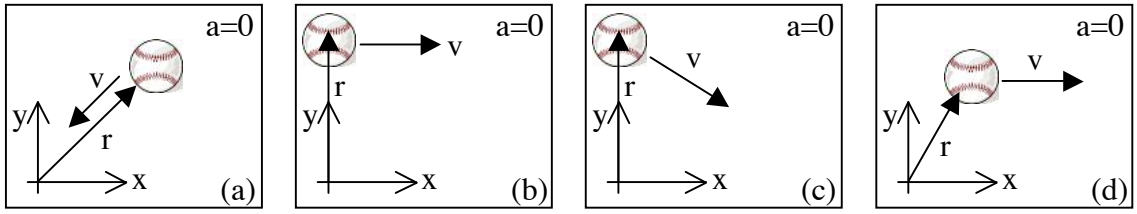
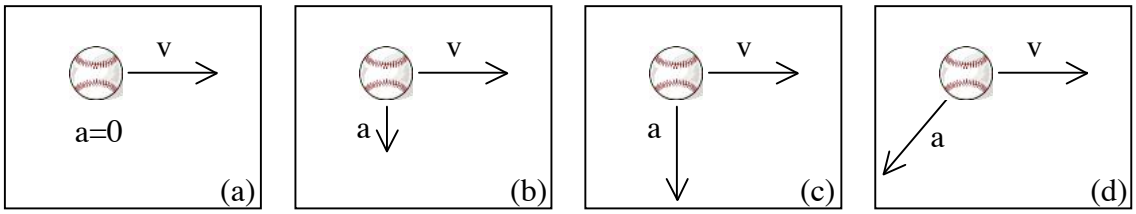
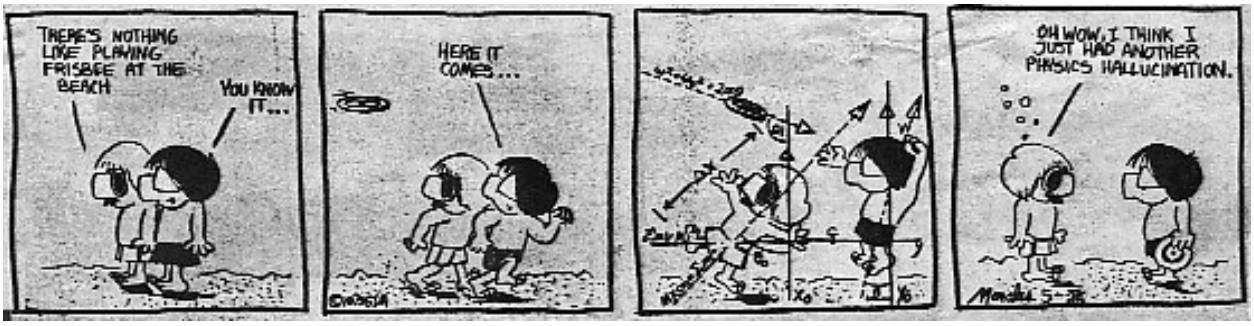
1. The images below are from individual frames of four different videos, each with the position and velocity vectors superimposed. In all four cases, the acceleration is zero. For each given frame, sketch the next frame in the video including the resulting position and velocity vectors. Explain your thinking.



2. The images below are from individual frames of four different videos, each with the velocity and acceleration vectors superimposed. The acceleration is constant. For each given frame, sketch the next frame in the video including the position of the ball, new velocity vector and new acceleration vector. Explain your reasoning.



3. A friend throws a Frisbee to you. Use a coordinate system with the origin at your feet with the x-axis horizontal toward your friend and the y-axis vertical. The initial position of the Frisbee is given by $\vec{r}_i = (15.0m)\hat{i} + (1.10m)\hat{j}$. You catch the Frisbee 30.0cm above your feet 2.50s after it is released. Find (a)the final position vector and (b)the average velocity vector for the Frisbee.



4. Using a coordinate system where x points eastward and y points northward, the position of a boat on a lake is given by $\vec{r}(t) = (t^3 + 5t^2)\hat{i} + (2t^2 - 3t)\hat{j}$ where the result is in meters when t is in seconds. Find (a)the velocity as a function of time, (b)the acceleration as a function of time, (c)the velocity at t = 3.00s, and (d)the initial acceleration. (e)Is there a time when the acceleration is zero?