1 A squirrel moves a nut from one point in space to another. After it arrives at its destination, the nut's displacement is...

1. either greater than or equal to
2. always greater than
3. always equal to
4. either smaller than or equal to
5. always smaller than
6. either smaller or larger than

...the distance it traveled.

Pi

2 A person initially at point *P* in the illustration stays there a moment and then moves along the axis to *Q* and stays there a moment. She then runs quickly to *R*, stays there a moment, and then strolls slowly back to *P*. Which of the position vs. time graphs below correctly represents this motion?
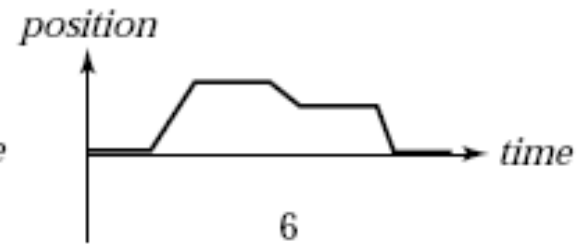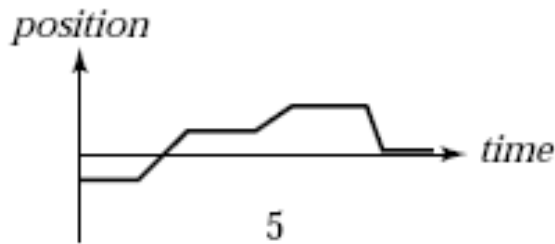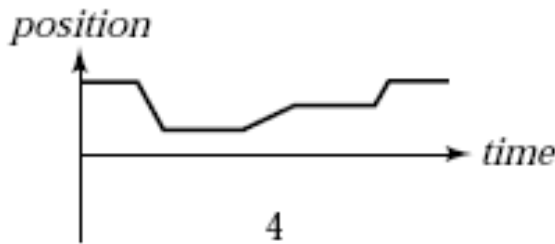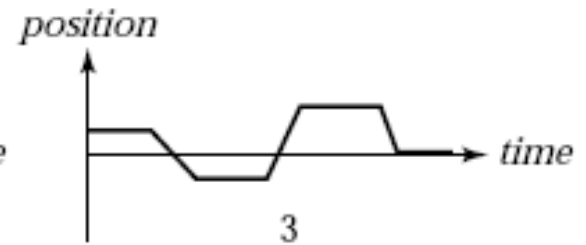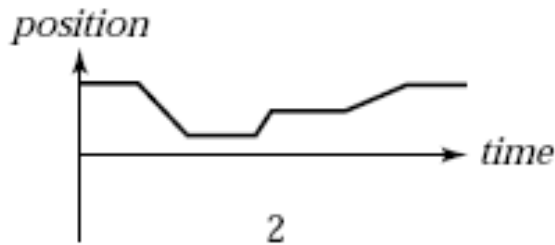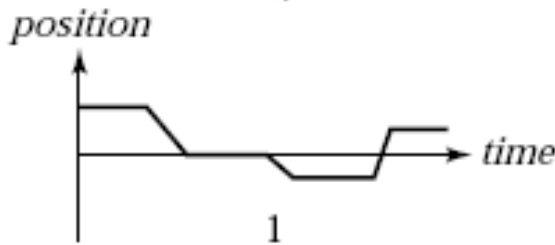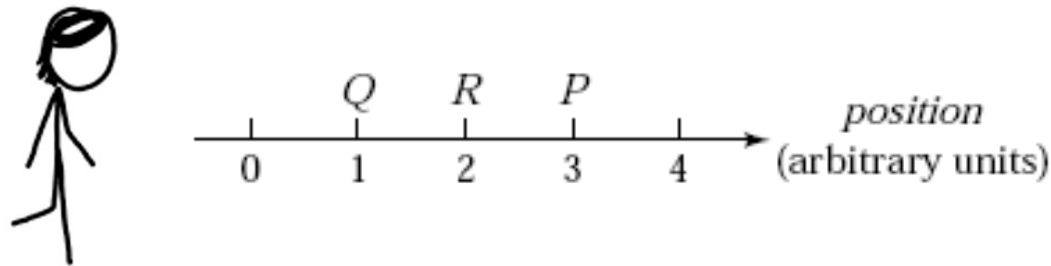
3 A ball is thrown vertically up, its speed slowing under the influence of gravity. Suppose (*a*) we film this motion and play the tape backward (so the tape begins with the ball at its highest point and ends with it reaching the point from which it was released), and (*b*) we observe the motion of the ball from a frame of reference moving up at the initial speed of the ball. The ball has a downward acceleration *g* in

1. *(a)* and *(b)*.
2. only *(a)*.
3. only *(b)*.
4. neither *(a)* nor *(b)*.

4 A train car moves along a long straight track. The graph shows the position as a function of time for this train. The graph shows that the train:
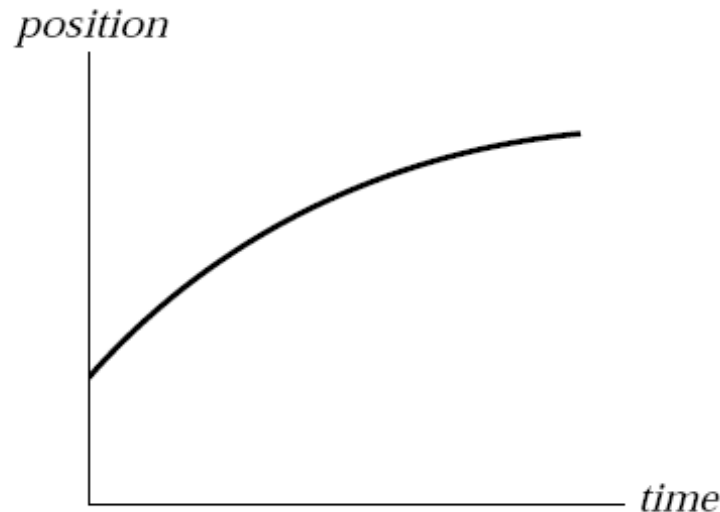
1. speeds up all the time.
2. slows down all the time.
3. speeds up part of the time and slows down part of the time.
4. moves at a constant velocity.

Pi

5 The graph shows position as a function of time for two trains running on parallel tracks. Which is true?
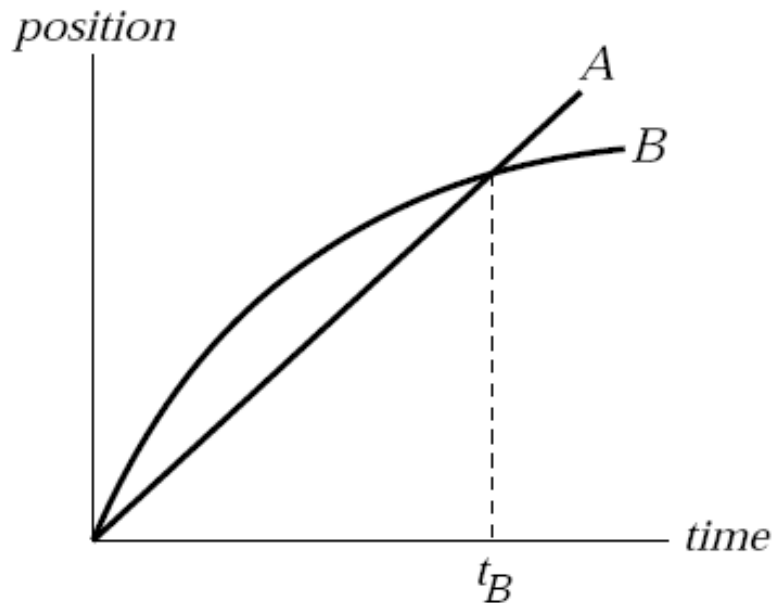
1. At time t_B, both trains have the same velocity.
2. Both trains speed up all the time.
3. Both trains have the same velocity at some time before t_B.
4. Somewhere on the graph, both trains have the same acceleration.

6 You throw your hat straight up in the air. At its highest point, your hat's

1. velocity and acceleration are zero.
2. velocity is nonzero but its acceleration is zero.
3. acceleration is nonzero, but its velocity is zero.
4. velocity and acceleration are both nonzero.

Pi