Class 4
Motion in 1D
Announcements

• First homework due 10:00pm tonight
• Clickers
• First exam next Friday
Concepts overview

1. Motion Diagrams

2. Equations of motion (constant acceleration)
Problem Solving Overview

- Equations of motion
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?
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.
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.
An object goes from one point in space to another. After it arrives at its destination, its 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.
A marathon runner runs at a steady 15 km/hr. When the runner is 7.5 km from the finish, a bird begins flying from the runner to the finish at 30 km/hr. When the bird reaches the finish line, it turns around and flies back to the runner, and then turns around again, repeating the back-and-forth trips until the runner reaches the finish line. How many kilometers does the bird travel?

1. 10 km                        3. 20 km
2. 15 km                        4. 30 km
If you drop an object in the absence of air resistance, it accelerates downward at 9.8 m/s\(^2\). If instead you throw it downward, its downward acceleration after release is

1. less than 9.8 m/s\(^2\).
2. 9.8 m/s\(^2\).
3. more than 9.8 m/s\(^2\).
A person standing at the edge of a cliff throws one ball straight up and another ball straight down at the same initial speed. Neglecting air resistance, the ball to hit the ground below the cliff with the greater speed is the one initially thrown

1. upward.
2. downward.
3. neither—they both hit at the same speed.