

Two Dimensional Kinematics

Concept Questions

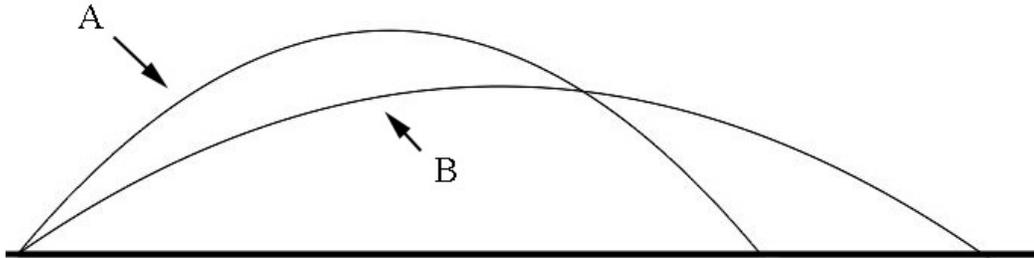
Question1

A batter hits a baseball into the air with an initial speed, $v_0 = 50 \text{ m} \cdot \text{s}^{-1}$, and makes an angle $\theta_0 = 30^\circ$ with respect to the horizontal. How long does it take to get to its highest point? When the ball is in flight, ignore all forces acting on the ball except for gravitation. Let $g = 10 \text{ m} \cdot \text{s}^{-2}$.

1. 2.0 s
2. 2.5 s
3. 3.0 s
4. 4.0 s
5. 5.0 s
6. 6.0 s

Question 2 Which Hits First

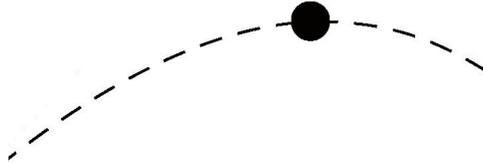
A person simultaneously throws two objects in the air. The objects leave the person's hands at different angles and travel along the parabolic trajectories indicated by A and B in the figure below. Which of the following statements best describes the motion of the two objects?



1. The object moving along the trajectory A hits the ground before the object moving along the trajectory B.
2. The object moving along the higher trajectory A hits the ground after the object moving along the lower trajectory B.
3. Both objects hit the ground at the same time.
4. There is not enough information specified in order to determine which object hits the ground first.

Question 3 Highest Point

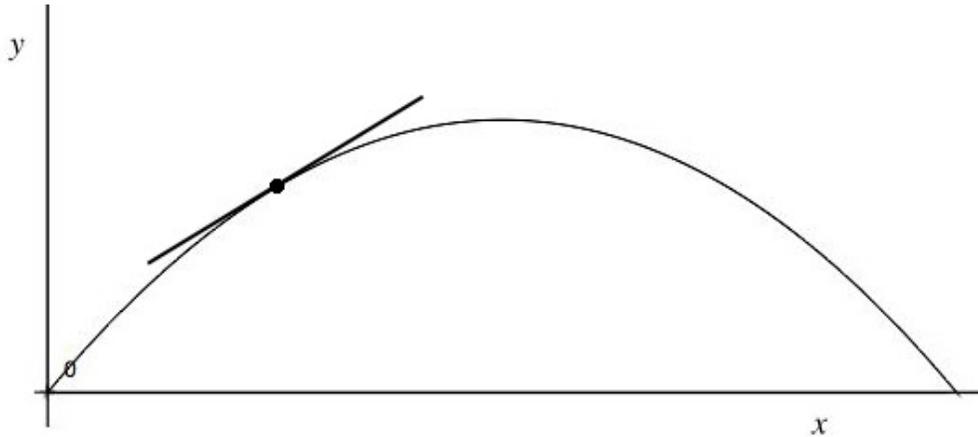
Consider the path of a ball moving along a path through the air under the action of the gravitational force. You may neglect the effects of air friction. As it reaches the highest point in its arc, which of the following statement is true?



1. The magnitudes of the velocity and acceleration are zero.
2. The magnitude of the velocity is at a minimum but not equal to zero.
3. The magnitude of the velocity is equal to zero, and the magnitude of the acceleration is constant and not equal to zero.
4. The magnitude of the velocity is at a minimum but not equal to zero and the magnitude of the acceleration is zero.
5. Neither the magnitudes of acceleration or velocity has yet attained its minimum value.

Question 4 Orbit Information

An object moves along a parabolic orbit under the influence of gravity. At each point along the orbit,



1. the magnitude of the velocity can be determined from the slope of the tangent line to the graph of y vs. x but not the direction
2. the magnitude and direction of the velocity can be determined from the slope of the tangent line to the graph of y vs. x
3. the magnitude and direction of the velocity cannot be determined from the slope of the tangent line to the graph of y vs. x
4. the direction of the velocity can be determined from the slope of the tangent line to the graph of y vs. x but not the magnitude.

MIT OpenCourseWare
<http://ocw.mit.edu>

8.01SC Physics I: Classical Mechanics

For information about citing these materials or our Terms of Use, visit: <http://ocw.mit.edu/terms>.