

Qualitative Problems

Short answer (in a complete sentence) or a fully labeled graph
(Given, Find, Solution NOT required)

1. Bullet A is dropped from rest. At the same instant bullet B is fired horizontally from a rifle. Sketch a diagram showing the trajectories of both bullets on the same diagram. Which bullet hits the ground first?

For questions 2-6 below, be sure to include arrowheads on each vector to clearly show its direction AND label each vector as F_g , v , v_x , v_y , or g .

2. Consider a ball that is dropped off of a cliff.
a. Draw the trajectory of the ball.

For each of the parts b-e below, draw a separate dot to represent the ball and then draw the appropriate force, velocity, or acceleration vector.

- b. At the point where the ball is halfway through its DOWNWARD motion, draw an FBD of the ball.
c. At the point where the ball is halfway through its DOWNWARD motion, draw the ball's total velocity vector.
d. At the point where the ball is halfway through its DOWNWARD motion, draw the ball's x and y velocity vectors.
e. At the point where the ball is halfway through its DOWNWARD motion, draw the ball's acceleration vector.

3. Consider a ball that is rolled off the edge of a table.
a. Draw the trajectory of the ball.

For each of the parts b-e below, draw a separate dot to represent the ball and then draw the appropriate force, velocity, or acceleration vector.

- b. At the point where the ball is halfway through its DOWNWARD motion, draw an FBD of the ball.
c. At the point where the ball is halfway through its DOWNWARD motion, draw the ball's total velocity vector.
d. At the point where the ball is halfway through its DOWNWARD motion, draw the ball's x and y velocity vectors.
e. At the point where the ball is halfway through its DOWNWARD motion, draw the ball's acceleration vector.

4. Consider a ball that is tossed at a 20-degree angle through the air.
- Draw the trajectory of the ball.

For each of the parts b-e below, draw a separate dot to represent the ball and then draw the appropriate force, velocity, or acceleration vector.

- At the point where the ball is halfway through its UPWARD motion, draw an FBD of the ball.
- At the point where the ball is halfway through its UPWARD motion, draw the ball's total velocity vector.
- At the point where the ball is halfway through its DOWNWARD motion, draw the ball's x and y velocity vectors.
- At the point where the ball is halfway through its DOWNWARD motion, draw the ball's acceleration vector.

5. Consider a ball that is tossed at a 45-degree angle through the air.
- Draw the trajectory of the ball.

For each of the parts b-e below, draw a separate dot to represent the ball and then draw the appropriate force, velocity, or acceleration vector.

- At the point where the ball is halfway through its UPWARD motion, draw an FBD of the ball.
- At the point where the ball is halfway through its UPWARD motion, draw the ball's total velocity vector.
- At the point where the ball is halfway through its DOWNWARD motion, draw the ball's x and y velocity vectors.
- At the point where the ball is halfway through its DOWNWARD motion, draw the ball's acceleration vector.

6. Consider a ball that is tossed at a 80-degree angle through the air.
- Draw the trajectory of the ball.

For each of the parts b-e below, draw a separate dot to represent the ball and then draw the appropriate force, velocity, or acceleration vector.

- At the point where the ball is halfway through its UPWARD motion, draw an FBD of the ball.
- At the point where the ball is halfway through its UPWARD motion, draw the ball's total velocity vector.
- At the point where the ball is halfway through its DOWNWARD motion, draw the ball's x and y velocity vectors.
- At the point where the ball is halfway through its DOWNWARD motion, draw the ball's acceleration vector.

HW Set 4 Answers

1-6. The trajectories, FBDs, and vector diagrams will be discussed in class.