

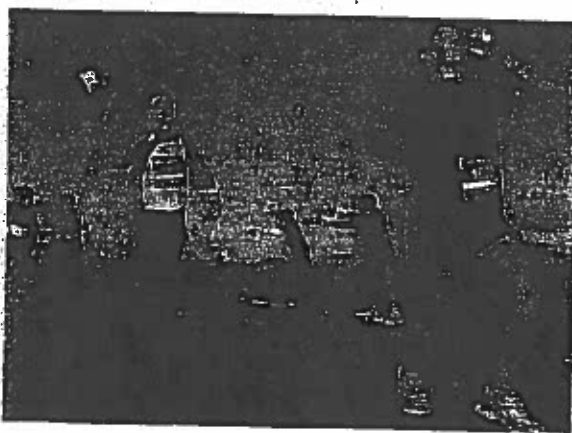
3.3 Check and Reflect

Key Concept Review

- Platform divers receive lower marks if they enter the water a distance away from the platform, whereas speed swimmers dive as far out into the pool as they can. Compare and contrast the horizontal and vertical components of each type of athlete's motion.
- For a fixed speed, how does the range depend on the angle, θ ?
- (a) For a projectile, is there a location on its trajectory where the acceleration and velocity vectors are perpendicular? Explain.
(b) For a projectile, is there a location on its trajectory where the acceleration and velocity vectors are parallel? Explain.
- Water safety instructors tell novice swimmers to put their toes over the edge and jump out into the pool. Explain why, using concepts from kinematics and projectile motion.

Connect Your Understanding

- Participants in a road race take water from a refreshment station and throw their empty cups away farther down the course. If a runner has a forward speed of 6.20 m/s , how far in advance of a garbage pail should he release his water cup if the vertical distance between the lid of the garbage can and the runner's point of release is 0.50 m ?

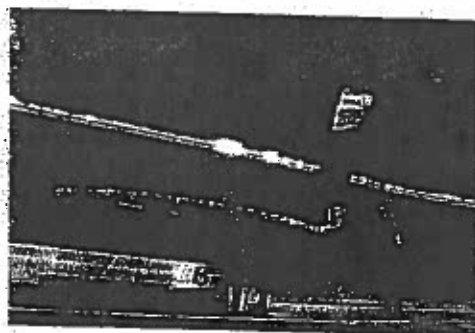


Question 5

- A baseball is thrown with a velocity of 27.0 m/s [35°]. What are the components of the ball's initial velocity? How high and how far will it travel?

- A football is thrown to a moving receiver. The football leaves the quarterback's hands 1.75 m above the ground with a velocity of 17.0 m/s [25°]. If the receiver starts 25.0 m away from the quarterback along the line of flight of the ball when it is thrown, what constant velocity must she have to get to the ball at the instant it is 1.75 m above the ground?

- At the 2004 Olympic Games in Athens, Dwight Phillips won the gold medal in men's long jump with a jump of 8.59 m . If the angle of his jump was 23° , what was his takeoff speed? (Treat the jumper as an object; ignore that his legs are in front of him when he lands.)



Question 8

- A projectile is fired with an initial speed of 120 m/s at an angle of 55.0° above the horizontal from the top of a cliff 50.0 m high. Find
 - the time taken to reach maximum height
 - the maximum height with respect to the ground next to the cliff
 - the total time in the air
 - the range
 - the components of the final velocity just before the projectile hits the ground
- Design a spreadsheet to determine the maximum height and range of a projectile with a launch angle that increases from 0° to 90° and whose initial speed is 20.0 m/s .

Reflection

- (a) What do you think is the most interesting information you learned in this section?
(b) How does this information connect with what you already knew about the subject?