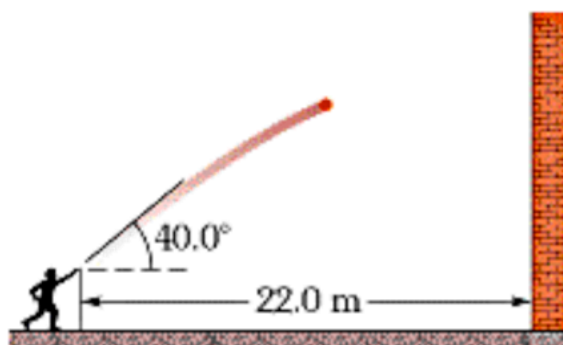


- A dart is thrown horizontally with an initial speed of 10 [m/s] toward point P, the bull's-eye on a dartboard. It hits at point Q on the rim, vertically below P, 0.17 [s] later. Neglect air resistance.

 - What is the distance PQ?
 - How far away from the dartboard is the dart released?
- A projectile is fired horizontally from a gun that is 52.0 [m] above flat ground, emerging from the gun with a speed of 250 [m/s] .

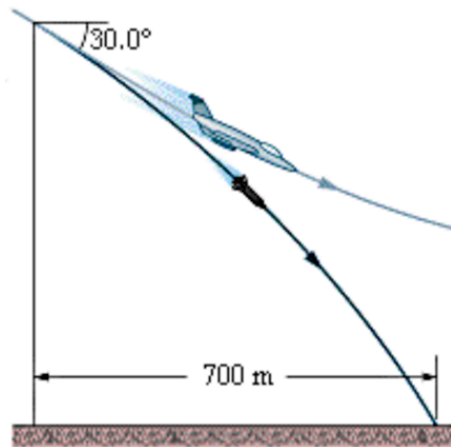
 - How long does the projectile remain in the air?
 - At what horizontal distance from the firing point does it strike the ground?
 - What is the magnitude of the vertical component of its velocity as it strikes the ground?
- A stone is catapulted at time $t = 0$, with an initial velocity of magnitude 24.0 [m/s] and at an angle of 50.0° above the horizontal. (Neglect air resistance.) Find its horizontal and vertical displacements from the catapult site at the following times after launch.

 - at $t = 0.70 \text{ [s]}$
 - at $t = 1.40 \text{ [s]}$
 - at $t = 3.75 \text{ [s]}$
- You throw a ball towards a wall at speed 29 [m/s] and at an angle 40.0° above the horizontal. The wall is 22.0 [m] from the release point of the ball.



- How long does the ball take to reach the wall?
- How far above the release point does the ball hit the wall?
- What are the horizontal and vertical components of its velocity as it hits the wall?
- When it hits, has it passed the highest point on its trajectory?

5. A certain airplane has a speed of 315 [m/s] and is diving at an angle of 30.0° below the horizontal when the pilot releases a radar decoy in the figure below. The horizontal distance between the release point and the point where the decoy strikes the ground is 700 [m] . (Neglect air resistance.)



- a. How high was the plane when the decoy was released?
- b. How long was the decoy in the air?

HW Set 3 Answers

- 1a. 0.142 [m]
1b. 1.7 [m]
- 2a. 3.26 [s]
2b. 814 [m]
2c. 31.9 [m/s]
- 3a. 10.8 [m] (horizontal)
3a. 10.5 [m] (vertical)
- 3b. 21.6 [m] (horizontal)
3b. 16.2 [m] (vertical)
- 3c. 57.9 [m] (horizontal)
3c. 0.09 [m] (vertical)
- 4a. 0.99 [s]
4b. 13.7 [m]
4c. 22.2 [m/s] (horizontal)
8.94 [m/s] (vertical)
4d. No, because the vertical component of the velocity is not equal to zero
- 5a. 437.14 [m]
5b. 2.56 [s]