

cq5-27

1. CJ6 3.CQ.001. [310932] Suppose an object could move in three dimensions. What additions to the equations of kinematics in Table 3.1 would be necessary to describe three-dimensional motion? (Select all that apply.)

$z = 1/2(v_{0z} + v_z)t$

$v_z = v_{0z} + a_z t$

$z = v_{0z}t + 1/2a_z t$

$z = 1/2(v_z + a_z)t$

$z = v_{0z}t + 1/2a_z t^2$

$v_z = v_{0z}^2 + a_z t$

$z = v_z t + 1/2a_z t^2$

$v_z^2 = v_{0z}^2 + 2az$

$v_{0z}^2 = v_z^2 + 2az$

2. CJ6 3.CQ.002. [310906] An object is thrown upward at an angle θ above the ground, eventually returning to earth.

(a) Is there any place along the trajectory where the velocity and acceleration are perpendicular? If so, where?

- at the initial position of motion
- at the highest point in the trajectory
- at the final position of motion
- velocity and acceleration are never perpendicular

Explain.

(b) Is there any place where the velocity and acceleration are parallel? If so, where?

- at the initial position of motion
- at the highest point in the trajectory
- at the final position of motion
- velocity and acceleration are never parallel

Explain.

3. CJ6 3.CQ.004. [311018] In baseball, the pitcher's mound is raised to compensate for the fact that the ball falls downward as it travels from the pitcher toward the batter. If baseball were played on the moon, would the pitcher's mound have to be higher than, lower than, or the same height as it is on earth?

- at a higher height
- at the same height
- at a lower height

Give your reasoning.

4. CJ6 3.CQ.006. [311068] Suppose there is a wind blowing parallel to the ground and toward the kicker in Figure 3.12. Then the acceleration component in the horizontal direction would not be zero.

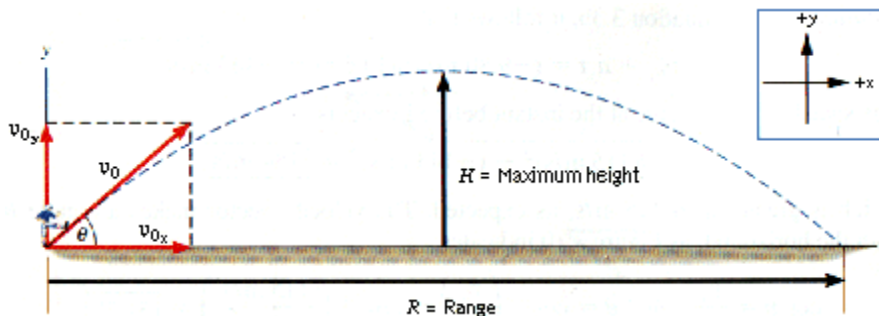


Figure 3.12

How would you expect the time of flight of the football to be affected, if at all?

- flight time will be shorter
- flight time will be longer
- flight time will remain the same

Explain.

5. CJ6 3.CQ.007. [311028] Concept Simulation 3.1 at www.wiley.com/college/cutnell provides a review of the concepts that are important in this question. A wrench is accidentally dropped from the top of the mast on a sailboat. Will the wrench hit at the same place on the deck whether the sailboat is at rest or moving with a constant velocity?

- yes, the wrench will hit the same place on the deck
- no, the wrench will not hit the same place on the deck
- not enough information to decide

Justify your answer.

6. CJ6 3.CQ.008. [310946] A rifle, at a height H above the ground, fires a bullet parallel to the ground. At the same instant and at the same height, a second bullet is dropped from rest. In the absence of air resistance, which bullet strikes the ground first?

- both bullets reach the ground at the same time
- bullet dropped from rest
- bullet fired from the rifle

Explain.

7. CJ6 3.CQ.011. [310903] A leopard springs upward at a 45° angle and then falls back to the ground. Does the leopard, at any point on its trajectory, ever have a speed that is one-half its initial value?

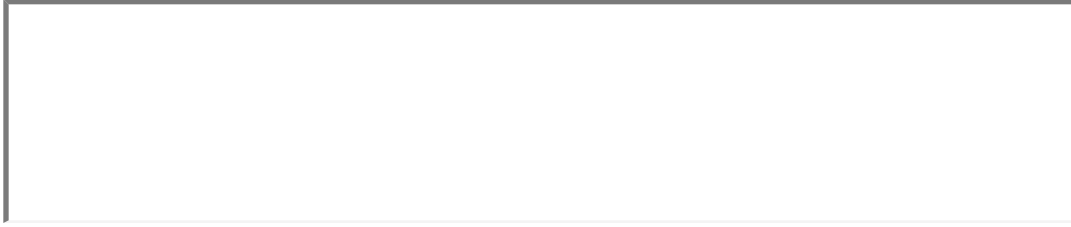
- yes
- no
- not enough information to decide

Give your reasoning.

8. CJ6 3.CQ.016. [311006] Three swimmers can swim equally fast relative to the water. They have a race to see who can swim across a river in the least time. Swimmer A swims perpendicular to the current and lands on the far shore downstream, because the current has swept him in that direction. Swimmer B swims upstream at an angle to the current and lands on the far shore directly opposite the starting point. Swimmer C swims downstream at an angle to the current in an attempt to take advantage of the current. Who crosses the river in the least time?

- swimmer A
- swimmer B
- swimmer C

Account for your answer.



[Submit for Testing](#)

Preview Tools

[Show All](#)

In View:

[Hide All](#)

Hidden: [Score](#) | [Mark](#) | [Help/Hints](#) | [Key](#) | [Solution](#)

[Show new Randomization](#) | [Print page](#)