

Use all the steps of problem solving and show work to find the answers for the following:
Do your work on notebook paper.

1. A rock is thrown straight down with an initial velocity of 14.5 m/s from a cliff. What is the rock's displacement after 2.0 s ? (Acceleration due to gravity is 9.80 m/s^2 .)

49 m

2. A rock is thrown straight up with an initial velocity of 24.5 m/s . What maximum height will the rock reach before starting to fall downward? (Take acceleration due to gravity as 9.80 m/s^2 .)

30.6 m

3. A rock is thrown straight up with an initial velocity of 19.6 m/s . What time interval elapses between the rock's being thrown and its return to the original launch point? (Acceleration due to gravity is 9.80 m/s^2 .)

4.00 s

4. Two objects of different mass are released simultaneously from the top of a 20-m tower and fall to the ground. If air resistance is negligible, which statement best applies? Use book.

- a. The greater mass hits the ground first.
- b. Both objects hit the ground together.
- c. The smaller mass hits the ground first.
- d. No conclusion can be made with the information given.

5. A baseball catcher throws a ball vertically upward and catches it in the same spot when it returns to his mitt. At what point in the ball's path does it experience zero velocity and non-zero acceleration at the same time? Use book.

- a. midway on the way up
- b. at the top of its trajectory
- c. the instant it leaves the catcher's hand
- d. the instant before it arrives in the catcher's mitt

6. A baseball is released at rest from the top of the Washington Monument. It hits the ground after falling for 6.0 s . What was the height from which the ball was dropped? ($g = 9.8 \text{ m/s}^2$ and assume air resistance is negligible)

$1.8 \times 10^2 \text{ m}$

7. A rock, released at rest from the top of a tower, hits the ground after 1.5 s. What is the speed of the rock as it hits the ground? ($g = 9.8 \text{ m/s}^2$ and air resistance is negligible)

15 m/s

8. Omar throws a rock down with speed 12 m/s from the top of a tower. The rock hits the ground after 2.0 s. What is the height of the tower? (air resistance is negligible)

44 m

9. Gwen releases a rock at rest from the top of a 40-m tower. If $g = 9.8 \text{ m/s}^2$ and air resistance is negligible, what is the speed of the rock as it hits the ground?

28 m/s

10. John throws a rock down with speed 14 m/s from the top of a 30-m tower. If $g = 9.8 \text{ m/s}^2$ and air resistance is negligible, what is the rock's speed just as it hits the ground?

28 m/s

11. The value of an object's acceleration may be characterized in equivalent words by which of the following? Use book.

- a. displacement
- b. rate of change of displacement
- c. velocity
- d. rate of change of velocity