

Group Quiz 2.4 – Free Fall

Name _____

Use the acceleration of gravity to be 9.81 m/s^2 , and use the convention that downward quantities are negative.

1. A rock falls from rest from a 23.0 m tall cliff. What time does it take to reach the ground? What is the velocity of impact?

2. An air rocket leaves the ground with an initial velocity of 34.2 m/s , and returns to the ground at the same elevation. What height does it reach before coming down? What time does it take to reach the top? What is its total time in the air?

3. A baseball is popped up and caught at the same elevation 8.32 seconds later. What time did it spend going up? What was its initial velocity? What two velocities does it have when it reaches an elevation of 60.0 m ? What time does it take from when it leaves the bat to when it reaches 60.0 m on the way up? What time does it take from when it leaves the bat to when it reaches 60.0 m on the way down?

4. A ball is thrown **downwards** from an 18.2 m tall building at a speed of 6.82 m/s. What is its velocity of impact with the ground? What time does it take to reach the ground?

5. A ball is thrown upward from the top of a 12.4 m tall tower, and strikes the ground 3.80 s later. What was its initial upward velocity? With what velocity does it strike the ground?

6. An air rocket leaves the ground and strikes a 9.50 m tall light tower on the way down with a speed of 6.20 m/s. What was its initial velocity leaving the ground? What time did it spend in the air?