

Physics 112
Chapter 3 (MHR)
Motion Problems – Free Fall

1. A stone dropped from a cliff hits the ground 4.00 s later.
 - a) Find the velocity with which the stone hit the ground.
 - b) How far did the stone fall?
 2. If an apple is dropped from the roof of an apartment building, how long will it take the apple to attain a velocity of 62.3 m/s?
 3. An object falls to the floor from a shelf 3.0 m high. With what velocity does the object strike the floor?
 4. A bullet shot vertically upward, has an initial velocity of 608 m/s.
 - a) How long does it take before the bullet stops rising?
 - b) What is the maximum height reached by the bullet?
 5. A stone dropped from a hot air balloon descending at 3.8 m/s lands on the ground 12 s later. How high above the ground was the hot air balloon when the stone was dropped?
 6. Fizzicks drops a bowling ball from his tree house to the ground 10.0 m below. With what velocity does the bowling ball hit the ground?
 7. A ball thrown vertically upward returns to the hand of the thrower 5.00 s later. How high did the ball go?
 8. A student drops a textbook out of the window of his classroom. After falling 1.9 m, it passes the top of a 0.76 m high window on a lower floor. How long does it take the textbook to travel the height of the window?
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1.
 - a) The final velocity was -39.2 m/s.
 - b) It fell 78.4 m (-78.4 m).
2. It will take 6.36 s.
3. The object will strike the floor with a velocity of -7.7 m/s.
4.
 - a) It takes 62.0 s.
 - b) It reaches a maximum height of 1.89×10^4 m.
5. Since the stone fell 7.5×10^2 m, the hot air balloon was 7.5×10^2 m above the ground when the stone was dropped.
6. It hits the ground with a velocity of -14.0 m/s.
7. The ball traveled 30.6 m upward.
8. It takes the textbook 0.11 s to cross the window.