

Acceleration Due to Gravity

1. A student standing on the roof of a building that is 88.5 m tall (about 30 floors) drops a stone over the edge. How long does it take for the stone to reach the ground? (4.25 s)
2. Another student standing on the roof of the 88.5 m tall building throws a stone, with a speed of 5.00 m/s, straight down off the edge of the roof. Now, how long does it take for the stone to reach the ground? (3.77 s)
3. A cannon, aimed vertically, fires a cannonball into the air. If the muzzle velocity is 38.0 m/s, calculate:
 - (a) how high the cannonball rises. (73.7 m)
 - (b) how long it is in the air. (7.76 s)
 - (c) the final velocity before it hits the ground (-38.0 m/s)
4. A sky-diver leaves a plane at an altitude of 3.00×10^3 m. The diver free falls for 6.00 seconds before opening her parachute. Because of air resistance the diver experiences an acceleration of only 8.00 m/s^2 during free fall. As the parachute fills with air, the diver is slowed to 5.00 m/s in 10.0 seconds. If the diver continues falling at this speed for the rest of the descent, how long will it take for the sky diver to reach the ground after leaving the plane? (534 s)
5. A ball player throws a baseball straight up to a height of 20.0 m.
 - (a) With what velocity did he throw the ball? (+19.8 m/s)
 - (b) How much time elapses from the time he throws it until he catches it? Assume he catches it at the same level it was released. (4.04 s)
 - (c) What is the velocity of the ball 2.50 s after it was released? (-4.70 m/s)
6. While visiting an iron-ore mine, a geology student drops a stone into a mine shaft. If the shaft is 250 m deep, how long will it be before she hears the stone strike the bottom? The speed of sound is 342 m/s and it travels at a constant speed? (7.87 s)