



Physics Olympiad and Problem Solving Programs

N210 - Introductory Physics Olympiad

Problem Set 3.2 - Mock Exam: Free Falls Solutions

Name:

Date:

1. C. The time the ball goes up is the same as it goes down. We can view this problem as a ball drop from rest and find the height at $t = 3$ s. Thus, $v = at = (10 \text{ m/s}^2)(3 \text{ s}) = 30 \text{ m/s}$.
2. C. The acceleration is constant and same as gravity.
3. D. $h = (30 \text{ m/s})(3 \text{ s}) + \frac{1}{2}(-10 \text{ m/s}^2)(3 \text{ s})^2 = 45 \text{ m}$.
4. C. From t_2 to t_3 , both cars covered 10 meters in the same time period.
5. D. Car 2 caught up with car 1 after 35 meter and clearly ahead of car 1 after 39 meters.
6. D. Car 2 and 3 covered the same distance during the same time period.
7. C. Car 3 traveled 2 meters from t_0 to t_1 , 6 meters from t_1 to t_2 , and so on. It traveled 18 meters from t_4 to t_5 and will travel 22 meters from t_5 to t_6 . Thus, its position will be $50 \text{ m} + 22 \text{ m} = 72 \text{ m}$.