

Gravity and Uniform Acceleration Worksheet

1. In an acceleration test for a sports car, two markers 0.30 km apart were set up along a road. The car passed the first marker with a velocity of 5.0 m/s [E] and passed the second marker with a velocity of 33.0 m/s [E]. Calculate the car's average acceleration between the markers.
2. A baseball travelling at 26 m/s [fwd] strikes a catcher's mitt and comes to a stop while moving 9.0 cm [fwd] with the mitt. Calculate the average acceleration of the ball as it is stopping.
3. A plane travelling at 52 m/s [W] down a runway begins to accelerate uniformly at 2.8 m/s^2 [W].
 - a. What is the plane's velocity after 5.0 s?
 - b. How far has it travelled during this 5.0 s interval?
4. A skier starting from rest accelerates uniformly downhill at 1.8 m/s^2 [fwd]. How long will it take the skier to reach a point 95 m [fwd] from the starting position?
5. For a certain motorcycle, the magnitude of the braking acceleration is $|4\vec{g}|$. If the bike is travelling at 32 m/s [S],
 - a. How long does it take to stop?
 - b. How far does the bike travel during the stopping time?
6. A car travelling along a highway must uniformly reduce its velocity to 12 m/s [N] in 3.0 s. If the displacement traveled during that time interval is 58 m [N], what is the car's average acceleration? What is its initial velocity?
7. An airplane accelerates from a velocity of 21 m/s at the constant rate of 3.0 m/s^2 over +535 m. What is its final velocity?
8. The pilot stops the same plane from #7 in 484 m using a constant acceleration of -8.0 m/s^2 . How fast was the plane moving before braking began?
9. A car is initially sliding backwards down a hill at -25 km/h. The driver guns the car. By the time the car's velocity is +35 km/h, it is + 3.2 m from its starting point. Assuming the car was uniformly accelerating, find the acceleration.
10. A brick falls freely from a high scaffold.
 - a. What is its velocity after 4.0 s?
 - b. How far does the brick fall during the first 4.0 s?
11. If you drop a golf ball, how far does it fall in 0.50 s?
12. A man falls 1.0 m to the floor.
 - a. How long does the fall take?
 - b. How fast is he going when he hits the floor?
13. A pitcher throws a baseball straight up with an initial speed of 27 m/s.
 - a. How long does it take the ball to reach its highest point?
 - b. How high does the ball rise above its release point?