One Dimensional Motion Worksheet

Solve the following problems on a separate sheet of paper. Show all work using the _prescribed_ problem solving method.

1. A car moving at 10 m/s speeds up uniformly to a speed of 30 m/s in a time of 5 seconds. What was the car's acceleration?   *Answer: 4 m/s^2*

2. A bus is moving at a speed of 20 m/s, when it begins to slow at a constant rate of 5 m/s^2 in order to stop at a bus stop. If it comes to rest at the bus stop, how far away was the bus from the stop?   *Answer: 40 m*

3. A block starting from rest slides down the length of an 18 m plank with a uniform acceleration of 4.0 m/s^2. How long does the block take to reach the bottom?   *Answer: 3.0 sec*

4. An airplane initially flying at a speed of 60.0 m/s accelerates at 5.0 m/s^2 for 600 meters. What is its velocity after this acceleration?   *Answer: 98 m/s*

5. A biker passes a lamppost at the crest of a hill at +4.5 m/s. She accelerates down the hill at a constant rate of +0.40 m/s^2 for 12 s. How far does she move down the hill during this time?   *Answer: 83 m*

6. A pilot stops a plane in 484 m using a constant acceleration of -8.0 m/s^2. How fast was the plane moving before braking began?   *Answer: 88 m/s*

7. Wile E. Coyote has strapped himself to an ACME rocket and is moving along at 25.0 m/s in pursuit of the roadrunner. As he is cruising along he realizes that he is heading directly for the edge of a cliff. He drags his feet in order to slow down at a constant rate of 5.86 m/s^2 until he comes to rest. If the cliff is 36.0 meters away, by how much does he overshoot the edge?   *Answer: 17.3 m*

8. A rocket traveling at 88 m/s is accelerated to 132 m/s over a 15 second interval. What is its displacement in this time?   *Answer: 1650 m*

9. A car sits in an entrance ramp to a freeway, waiting for a break in traffic. The driver sees a small gap between two vehicles and accelerates with constant acceleration along the ramp onto the freeway. The car starts from rest, moves in a straight line, and has a speed of 20 m/s when it reaches the end of the 120-m ramp. What is the acceleration of the car?   *Answer: 1.7 m/s^2*

    a. How much time does it take the car to reach the end of the ramp?   *Answer: 12 s*

    b. The traffic on the freeway is moving at a constant speed of 20 m/s. What distance does traffic travel while the car is moving the length of the ramp?   *Answer: 240 m*

10. An object starts from rest and accelerates uniformly at 5 m/s^2 for 3 seconds, then continues at a constant speed for 2s and finally accelerates uniformly at 2 m/s^2 for 3 seconds.

    a. Make a graph of the displacement vs. time **_and_** the velocity vs. time.

    b. Find the final speed of the object.   *Answer: 21 m/s*

    c. Find the total distance traveled during this 8-second interval.   *Answer: 107 m*