

Kinematics problem set 1.

Name _____

Period _____

Date _____

For the following problems solve for the unknown variable in the equation
 $v_f = v_i + at$.

1. $v_f = 5 \text{ m/s}$ $v_i = 2 \text{ m/s}$ $a = .5 \text{ m/s}$ $t = ?$

2. $v_f = 0 \text{ m/s}$ $v_i = 45 \text{ m/s}$ $a = -10 \text{ m/s}$ $t = ?$

3. $v_f = ?$ $v_i = 3 \text{ m/s}$ $a = 5 \text{ m/s}$ $t = 3 \text{ sec}$

4. $v_f = 50 \text{ m/s}$ $v_i = 0 \text{ m/s}$ $a = ?$ $t = 12 \text{ sec}$

5. $v_f = 1 \text{ m/s}$ $v_i = 1 \text{ m/s}$ $a = 5 \text{ m/s}$ $t = ?$

6. $v_f = 5 \text{ m/s}$ $v_i = -12 \text{ m/s}$ $a = ?$ $t = 12 \text{ sec}$

Solve the following word problems.

1. A car starts from rest and travels for 10 seconds with a constant acceleration of 3.0 m/s/s. The driver then applies the brakes causing a constant negative acceleration of -4.0 m/s/s. Assuming the brakes are applied for 2.0 seconds: How fast is the car going at the end of braking?

2. Automobile experts will oftentimes refer to a car's "0 to 60 time", the time it takes for a car to go from rest to 60 miles/hour, when talking about how powerful its engine is. For example, a Ferrari Daytona's "0 to 60 time" is about 6 seconds.

a) What is the acceleration of this car compared to that of gravity (the acceleration due to gravity is 9.8 m/s/s)?

b) If you had a car able to accelerate at 1 g, what would its "0 to 60 time" be?

3. A car accelerates at a rate of 0.6 m/s/s. How long does it take (time) for this car to go from a speed of 55 mi/h to 60 mi/h?

4. A jet acquires a lift-off speed of 112 m/s in 20.0 s, starting from rest and traveling due east. What are the magnitude and direction of its average acceleration?

5. A jalopy travels on a long straight level road at 50 km/hr and then speeds up to 90 km/hr in 15 seconds. Calculate the jalopy's acceleration in m/s/s.