Kinematics problem set 3.

Name _____
Period _____
Date _____

For the following problems solve for the unknown variable in the equation $v_f^2 - v_i^2 = 2a(x_f - x_i)$.

1. $v_f = 5$ m/s $v_i = ?$ $x_f = 10$ m $x_i = 2$m $a = .5$ m/s/s

2. $v_f = 5$ m/s $v_i = 10$ m/s $x_f = 10$ m $x_i = 2$m $a = ?$

3. $v_f = 10$ m/s $v_i = 3$ m/s $x_f = ?$ $x_i = 0$m $a = .5$ m/s/s

4. $v_f = 5$m/s $v_i = 0$m/s $x_f = 10$ m $x_i = ?$ $a = 1$ m/s/s

5. $v_f = ?$ $v_i = 0$m/s $x_f = 10$ m $x_i = 2$m $a = .5$ m/s/s

6. $v_f = 15$m/s $v_i = 0$m/s $d = ?$ $a = .5$ m/s/s

Solve the following word problems.

1. A car increases its velocity from 15 m/s to 25 m/s in the distance of 20 m.
a. Find the magnitude of this acceleration

b. Find the time it takes for the car to travel this distance

2. A bike accelerates uniformly from rest to a speed of 7.10 m/s over a distance of 35.4 m. Determine the acceleration of the bike.

3. An engineer is designing the runway for an airport. Of the planes which will use the airport, the lowest acceleration rate is likely to be 3 m/s/s. The takeoff speed for this plane will be 65 m/s. Assuming this minimum acceleration, what is the minimum allowed length for the runway?

4. A kangaroo is capable of jumping to a height of 2.62 m. Determine the takeoff speed of the kangaroo.

5. A bullet leaves a rifle with a muzzle velocity of 521 m/s. While accelerating through the barrel of the rifle, the bullet moves a distance of 0.840 m. Determine the acceleration of the bullet (assume a uniform acceleration).

6. It was once recorded that a Jaguar left skid marks which were 290 m in length. Assuming that the Jaguar skidded to a stop with a constant acceleration of -3.90 m/s/s, determine the speed of the Jaguar before it began to skid.