Name: Period:

All Equations of Motion 1

*Show all work including the equations and substitution with units*

1. A ball rolls down a hill with a constant acceleration of 3.0 m/s2.

(a) If it starts from rest, what is its speed at the end of 4.0 s?

(b) How far did the ball move in that 4.0 s?

2. A car moving on a straight road increases its speed at a uniform rate from 10 m/s to 20 m/s in 5.0 s.

(a) What is its acceleration?

(b) How far did it go during those 5.0 seconds?

3. A bicyclist brakes from 21 m/s to a stop in 32.3 m.

a. What is the acceleration of the bicyclist?

b. How much time does it take for the bicyclist to stop?

c. What is the bicyclist’s average speed?

4. On a roller coaster ride at an amusement park, a car travels from 7.6 m/s to 56 m/s in 3.0 seconds.

a. What is the car’s acceleration?

b. How much distance did the car travel in the 3.0 seconds that it was accelerating?

c. If the car continued this acceleration, how fast would it be traveling after 150 m?

5. A jet plane lands with a velocity of 100 m/s and can accelerate at a maximum of -9.0 m/s2 as it comes to rest.

(a) From the minute that the plane touches the runway, what is the minimum time needed before it can come to rest?

(b) Can this plane land on a small island airport where the runway is 0.80 km long? (Hint: Is the distance needed with this size acceleration greater than 0.80 km?)

6. A bullet is fired through a board 10.0 cm thick in such a way that the bullet's line of motion is perpendicular to the face of the board. If the initial speed of the bullet is 400 m/s and it emerges from the other side of the board with a speed of 300 m/s, find

(a) the acceleration of the bullet as it passes through the board, and

(b) the total time the bullet is in contact with the board.

7. An F-15 jet fighter starts from rest and reaches a speed of 330 m/s in 2 seconds.

a. What is the planes acceleration?

b. How much distance did the jet cover in the 2 seconds?

c. How fast was the jet traveling after 1 second?