Physics

name _____ blk ____

Inv-1 Expan IV One Dim. Motion

sheet #____

1. The head of a rattlesnake can accelerate 50.0 m/s^2 in striking a victim. If a car could do as well, how long would it take for it to reach a speed 24.6 m/s (which is about 55 mi/h) from rest?

2. A few years ago, the legal speed limit on the Turner Turnpike between Tulsa and Oklahoma City was changed from 55.0 mi/h to 75.0 mi/h. How much time was saved on the 86.0 mile trip for someone traveling at the legal speed limit?

3. In an emergency, a driver brings a car to a full stop in 5.00 seconds. The car is traveling along a highway at a rate of 24.6 m/s when braking begins.
   a. At what rate is the car accelerated?
   b. How far does it travel before stopping?

4. A supersonic jet flying at 200. m/s is accelerated uniformly at the rate of 23.1 m/s^2 for 20.0 seconds.
   a. What is its final speed?
   b. Physicist Ernst Mach studied the effects of motion faster than sound, and the ratio of a speed to that of sound is called its "Mach number". Mach 1.00, the speed of sound, is about 331 m/s (approx. 740 mi/h) at supersonic airplane altitudes. What is the Mach speed of our jet? (The fastest known plane, the SR-71 Blackbird, flies at Mach 3.2.)

5. If a bullet leaves the muzzle of a rifle with a speed of 600. m/s, and the barrel of the rifle is 0.800 m long, at what rate is the bullet accelerated while in the barrel?