

Linear Locomotion Questions

Name: _____

- 1-1 A plane is sitting on a runway awaiting takeoff. On an adjacent runway, another plane lands and passes the stationary plane at a speed of 45 m/s. The arriving plane has a length of 36 m. By looking out the window (very narrow) of the stationary plane, you can see the moving plane. For how long is the moving plane visible to you?
- 1-2 The three-toed sloth is the slowest moving land mammal. On the ground, the sloth moves at an average speed of 0.037 m/s, considerably slower than the giant tortoise, which walks at 0.076 m/s. After 12 minutes of walking, how much further would the tortoise have gone relative to the sloth?
- 2-1 For a standard production car, the highest road-tested acceleration ever reported occurred in 1993, when a Ford RS2000 Evolution went from zero to 26.8 m/s (60 mi/h) in 3.275 s. Find the magnitude of the car's acceleration.

- 2-2 A runner accelerates to a velocity of 5.36 m/s due west in 3.00 s. His average acceleration is 0.640 m/s^2 , also directed due west. What was his velocity when he began accelerating?
- 2-3 Starting from rest, a speedboat reaches a speed of 3.2 m/s in 2.0 s. What is the boat's speed after an additional 3.0 s has elapsed, assuming the boat's acceleration remains constant?
- 3-1 A truck, traveling at a velocity of 33 m/s due east, comes to a stop by accelerating at 11 m/s^2 west. How far does the truck travel in the process of stopping? (Watch your signs!)
- 3-2 The length of the barrel of a primitive blowgun is 1.2 m. Upon leaving the barrel, a dart has a speed of 14 m/s. Assuming that the dart is uniformly accelerated, how long does it take for the dart to travel the length of the barrel? (Hint: What is the dart's original velocity? What is its average velocity?)