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HW 2.1 Uniform Acceleration

SHOW ALL WORK! THIS MEANS KUNFU!!!!

1. With a time of 6.92 s, Irina Privalova of Russia holds the women's record for running 60 m. Suppose she ran this distance with a constant acceleration, so that she crossed the finish line with a speed of 17.34 m/s. Assuming she started at rest, what was Privalova's average acceleration.

2. A handball is hit toward a wall with a velocity of 13.7 m/s to the **right**. It bounces off the wall to the **left** with a velocity of 11.5 m/s. The ball was in contact with the wall for 0.021 seconds. What is the handball's average acceleration?

3. A type of firework consists of a cardboard tank mounted on plastic wheels and driven forward by a small rocket. Once the rocket ignites, the tank rolls from rest to a maximum velocity of 0.85 m/s forward, at which point the rocket burns out. If the total time that the rocket remains ignited is 3.7 s, what is the average acceleration of the tank?

4. Currently the fastest production car ever made is the Bugatti Veyron EB 16.4 (Super Sport). It can accelerate from 0 - 60.0 mi/hr at 11.29 m/s^2. How long in seconds does it take the Bugatti to go from 0 - 60.0 mi/hr?

5. The brakes of a car moving at 14 m/s are suddenly applied and the car comes to a stop in 4 sec. (a) What was the acceleration? (b) How long would the car take to come to a stop starting from 20 m/s with the same acceleration? (c) How long would the car take to slow down from 20 m/s to 10 m/s with the same acceleration?

6. A treadmill has an average acceleration of 4.7 E-3 m/s^2. What is the velocity of the treadmill after 5 minutes? Assume it started from rest.

7. A car traveling at +7.0 m/s accelerates at 0.80 m/s^2 for 2.0 seconds. What is the final velocity of the car?

8. A train comes to a stop in 3 minutes. If the train had a uniform acceleration of –3.5 m/s^2 what was initial velocity of the train?

9. A stunt gazelle on a bike accelerates from rest with an average acceleration of 3.5 m/s^2 how long did it take the stunt gazelle to reach a velocity of 30 m/s?

10. A car accelerates from rest to 100 mi/hr with an acceleration of 8.55 m/s^2. How long in seconds did this take?

11. A stunt gazelle in a car slows from 100 km/hr to 80 km/hr in 1.2 seconds. (a) What was the acceleration in m/s^2? (b) If the car could maintain this acceleration how much longer would it take to come to a complete stop?