

Physics Basics, Movement, and Vectors

In-Class Example Problems

Velocity:

1. Two trains are traveling in the same direction on parallel tracks, where train A is moving at 50km/h, and train B is moving at 60km/h. If train B is initially 20km behind train A, how long will it take for train A to catch up to train B?

Kinematics:

2. In 1865 Jules Verne proposed sending men to the Moon by firing a space capsule from a 220m-long cannon, where they would have exited the cannon traveling at 10.97km/s. What would have been the unrealistically large acceleration experienced by the space travelers during the launch?

Free-Fall:

3. A model rocket is launched straight upward from rest at ground level. It accelerates with a constant upward acceleration of 2m/s^2 until its engines stop at an altitude of 150m. Assuming no parachute opens up, and no air resistance in general, how much total time does it take for the rocket to reach its highest point?

