
SCI 340 Worksheet #2
Constant Acceleration

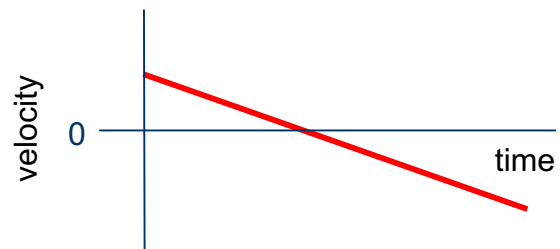
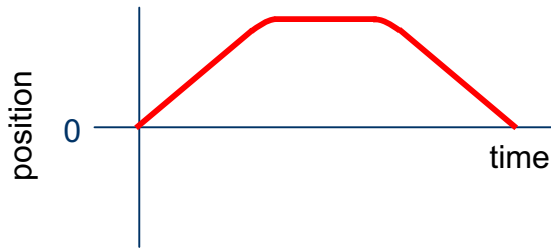
1. In 1954 the English runner Roger Bannister broke the four-minute barrier for a mile with a time of 3:59.4 s. In 1999 the Moroccan runner Hicham el-Guerroj set a record of 3:43.1 s for the mile. If these two runners had run against each other, each running at the same average speed of their record races, what distance ahead of Bannister would el-Guerroj have finished?

2. A tourist being chased by an angry moose is running in a straight line toward his car at a speed of 4.0 m/s. The car is a distance d away. The moose is 26 m behind the tourist and running at 6.0 m/s. The tourist reaches his car safely. What is the maximum possible value for d ?

3. The fastest road-tested acceleration for a standard production car occurred in 1993, when a Ford RS200 Evolution went from 0 to 26.8 m/s in 3.275s. Find the magnitude of the car's average acceleration.

4. A ball starts from rest and rolls down an incline at a constant acceleration. In 5 s, it rolls a distance of 50 m down the hill.
- What is its acceleration?
 - If the same ball rolls down the same incline with the same acceleration, but begins with an initial downhill velocity of 2.0 m/s, how far down the hill will it be in 5 s?
 - If the ball begins with an initial uphill velocity of 2.0 m/s, where will it be at 5 s?

5. In the following scenarios, the motion of an object is to be described in four ways: (i) in words, (ii) as a position-time graph, (iii) as a velocity-time graph, and (iv) as an acceleration-time graph. In each case, only one description is given. Construct the other three. (You may need to assume some initial conditions.)



A coconut hangs motionless from

its tree, then drops with

increasing downward speed

until it lands on the ground,

quickly coming to rest.

