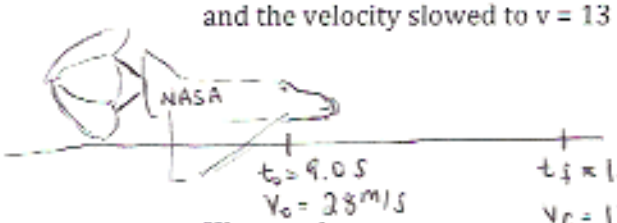
Example 4:
The last shuttle mission is making its landing in Houston. The shuttle, initially at a time $t_o = 9.0$ s, has a velocity of 28 m/s. At a later time, t = 12 s, the parachute has been deployed and the velocity slowed to v = 13 m/s. What is the average acceleration of the space shuttle?



$$\bar{a} = \frac{\Delta v}{\Delta t} = \frac{v_f - v_o}{t_f - t_o}$$

$$\bar{a} = \frac{13 - 28}{12 - 9} = \frac{-15}{3}$$

$$\bar{a} = -5.00\ m/s^2$$

Kinematics:

Example 5:
You are designing an airport for small planes. One of the planes that will use this airfield must reach a velocity of 27.8 m/s to take off. The planes can accelerate at a uniform rate of 2.0 m/s^2.

A. If the runway is 150 meters long, will the airplane be able to take off? Find the velocity of the plane at 150 m to determine if the runway will work?
B. If the runway will not allow the plane to get up to its necessary velocity, find the minimum length the runway can be.

Example 6:
Estimate the total stopping distance of a car traveling at a constant 60.0 mph (approximately 27.0 m/s). To properly calculate the stopping distance, two distances must be taken into account: the reaction time before any action can be taken and the actual braking time. Most people have an average reaction time of about 0.500 s.

A. What is the distance traveled by the car during the reaction time? No braking has yet occurred.
B. What is the distance traveled by the car during the braking time if the car has an average acceleration of -6.00 m/s^2
C. What is the total stopping distance?

Example 7:
A speeding driver flies along a straight, desert road going 120.0 km/h and passes a stationary police officer. The officer immediately takes off in pursuit with a constant acceleration of 2.78 m/s^2. How much time will it take for the police officer to catch the speeder?