Chapter 2 Problem 32 [†]

Given
$v = 88\ km/h$
$t = 12\ s$

Solution
a) Find the acceleration.

First convert the velocity into m/s.

$$v = 88\ km/h \left(\frac{1\ h}{3600\ s}\right)\left(\frac{1000\ m}{1\ km}\right) = 24.4\ m/s$$

From the definition of acceleration

$$\bar{a} = \frac{\Delta v}{\Delta t} = \frac{v_f - v_i}{t_f - t_i} = \frac{24.4\ m/s - 0\ m/s}{12\ s - 0\ s} = 2.03\ m/s^2$$

b) Find the distance traveled during this time.

Using the kinematic equation relating position with time gives

$$x = x_0 + v_0 t + \tfrac{1}{2}at^2$$

$$x = 0\ m + (0\ m/s)(12\ s) + \tfrac{1}{2}(2.03\ m/s^2)(12\ s)^2 = 146\ m$$

[†]Problem from Essential University Physics, Wolfson