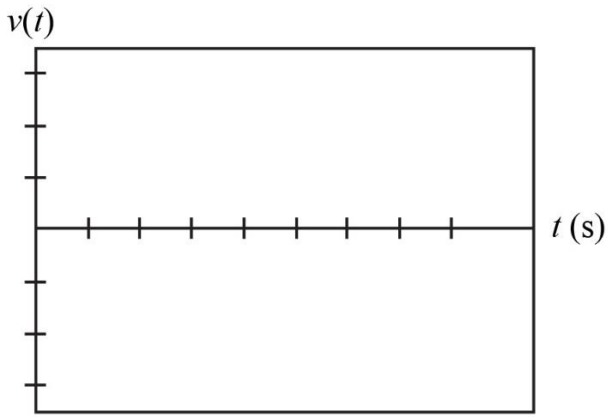
P2.5-1) A train starts from rest and travels along its track in a straight line. The engine has the capability of moving the train with a maximum acceleration of 3.5 ft/s^2. The maximum safe speed of the train is 65 mph. What is the minimum time needed for the train to travel 15 miles?

Given:

Find:

Solution:

Plot the velocity of the train.



Time

Calculate the time it takes to reach the maximum safe speed.

t_{max} = _____

Displacement

Calculate how far the train travels before it reaches maximum speed. We will call this segment A.

Δs_A = _____

Determine the displacement, as a function of time, of the train during the time it travels at maximum speed. We will call this segment B.

$\Delta s_B(t)$ = _____

Time

Calculate the total time of travel.

t_{total} = _____