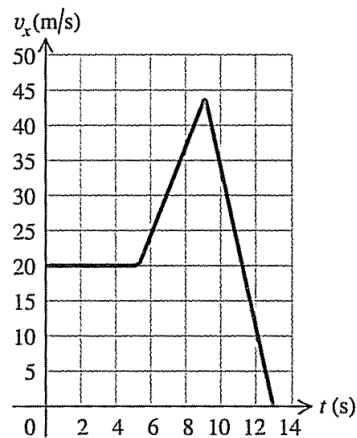**x, v, & a**    Express the dimensions of the following variables using the base dimensions of length and time.

1. position

2. velocity

3. acceleration

Describe how you would find the other 2 variables if given any 1 of the above. Do this for each variable.

**Graphing Motion**



Above is a plot of a car's velocity as a function of time.
(a) Find the acceleration of the car at times t = 3 s, at t = 7 s, and at t = 11 s.
(b) How far does the car travel between t = 2 s and t = 13 s?
(c) Sketch a plot of the car's position as a function of time.
(d) Sketch a plot of the car's acceleration as a function of time.
Appropriately scale and number the axes in both plots.

---

[0]Select problems may be modified from Walsh, Harrison, or the Internet.

**Average Quantities**   Emily jogs 300 meters north in 10 minutes she then walks 100 meters south in 5 minutes. Find the following:

1. Emily's total distance traveled.

2. Emily's displacement

3. Emily's average speed.

4. Emily's average velocity.

**Skateboarding Susie**   Susie is skateboarding on a straight sidewalk.

- She starts at rest at time t = 0 s.

- Over the course of the next two seconds, she accelerates at a constant rate up to 2 m/s north.

- She maintains this velocity for half a second.

- Then, she slows down to 0 m/s over the course of one second.

- She takes a brief pause of half a second.

- Finally, she takes three seconds to accelerate up to a velocity of 2 m/s south.

For the following plots, draw out a grid, scale the axis appropriately, and make sure you label both your horizontal and vertical axes!
Plot Susie's velocity as a function of time.
Plot Susie's acceleration as a function of time.
Plot Susie's position as a function of time.
How would both of these plots respectively relate to the velocity plot above?
Make sure you label your horizontal and vertical axes!