Reading notes - Motion Along a Straight Line

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2.1 Position, Displacement, and Average Velocity

key ideas

1. The position x of a particle on an x axis locates the particle with respect to the origin
2. The sign of the position indicates the direction the particle is located with respect to the origin
3. Displacement Δx is the change in position of the particle

$$\Delta x = x_2 - x_1$$

4. Average velocity is the displacement of a particle over the time interval

$$\nu_{avg} = \frac{\Delta x}{\Delta t} = \frac{x_2 - x_1}{t_2 - t_1}$$

5. The sign of ν_{avg} indicates the direction of the motion with respect to the origin. Average velocity is not a function of distance traveled it is a function of initial and final position.
6. On a graph of x and t, average velocity is the slope of the line connecting two points on the graph.
7. Average speed, s_{avg} is the total distance travel over the time interval

$$s_{avg} = \frac{\text{total distance}}{\Delta t}$$

2.1.1 Motion

Kinematics is the classification and comparison of motions. Initially we restrict motion in a couple of way to examine the most basic cases and get comfortable with the fundamental concepts of kinematics. First, motion is only along a straight line. Forces cause motion but will not be discussed we are looking exclusively at the motion and how it changes. The object in motion is either a particle, point-like object like electrons, or objects that are rigid enough to behave like particles.

2.1.2 Position and Displacement