January 23, Week 2

Today: Chapter 2, Introduction to Kinematics

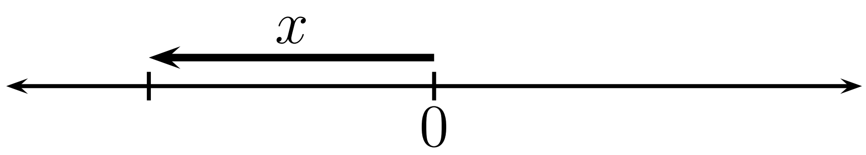
Homework Assignment #1: 4 Introductory Mastering Physics Problems due tonight, 11:59PM.

Homework Assignment #2 due January 30
Mastering Physics: 1.6, 2.4, 2.59, and 3 special Mastering Physics problems.
Written Problem: 2.75.

Syllabus Addendum: Exam 1 will be on February 10. Exam 2 will be on February 24. Corrected syllabi can be downloaded on the class webpage.

Review

Position - x: How far and what direction from origin.



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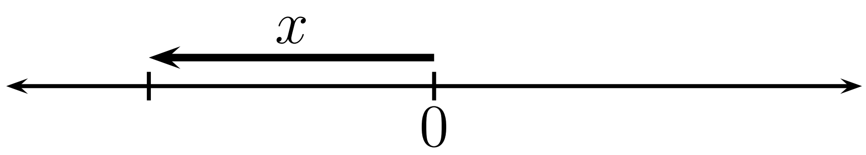
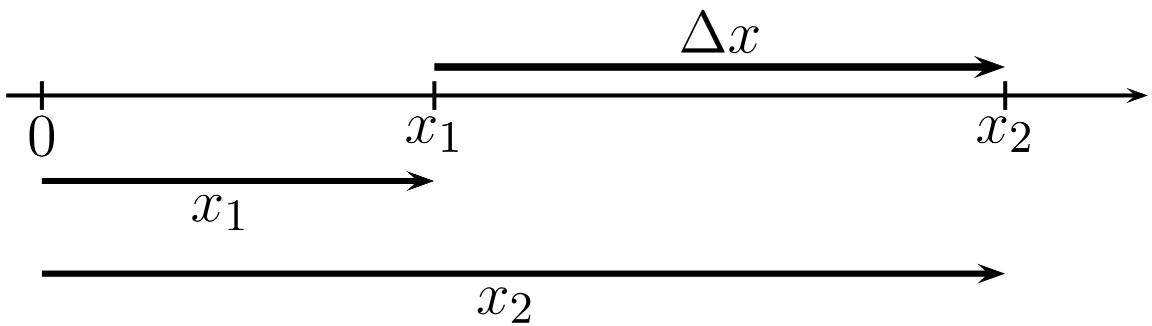


Displacement - $\Delta x = x_2 - x_1$, Change in position = how far and in what direction an object moves.



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Example: A bird $6\,m$ above the ground swoops straight down to get a worm $50\,cm$ below the ground. After getting the worm, the bird flies straight back up to its original position. For the down and back total motion, what is the bird's displacement and distance covered?

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To include information about direction, we simply use displacement instead of distance.

$$v_{av} = \frac{displacement}{elapsed\, time} = \frac{\Delta x}{\Delta t}$$

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- Exceptions:
  - Strings of zeros at the end of large numbers or at the beginning of small numbers are not significant.
  - Zeroes at the end of all numbers are significant.

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- Example: Convert $1.86\,km/min$ to miles per hour. Use $1.00\,mi = 1.609\,km$ and $1\,h = 60\,min$.

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$$10^2\,cm = 1\,m \Rightarrow \left(10^2\,cm\right)^3 = (1\,m)^3 \Rightarrow 10^6\,cm^3 = 1\,m^3$$

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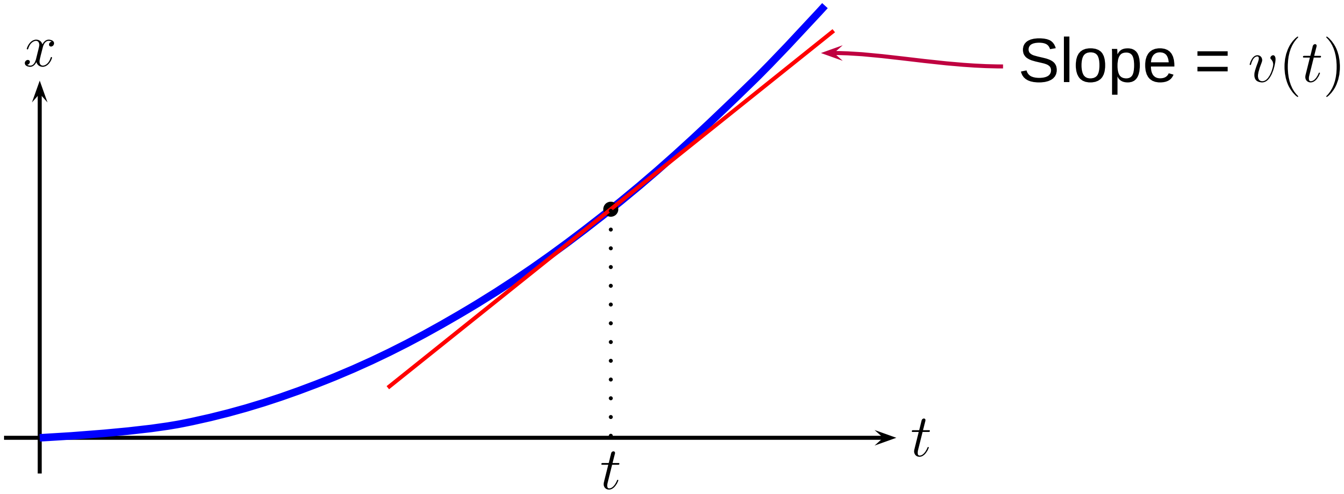

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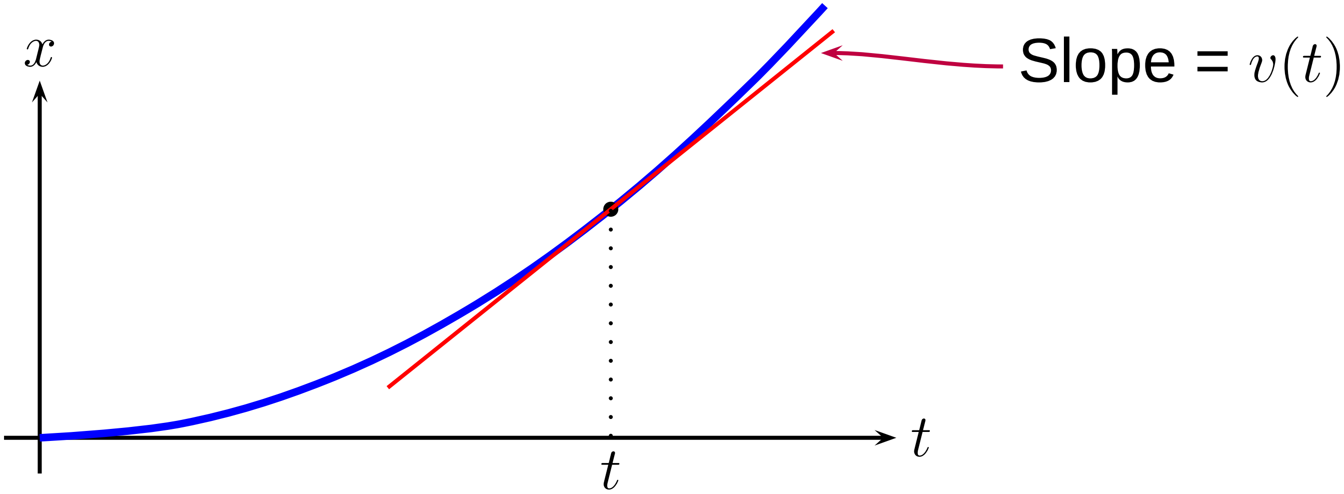

$$v = \lim_{\Delta t \to 0} \frac{\Delta x}{\Delta t} = \frac{dx}{dt}$$

Velocity is the time derivative of position, *i. e.* , the slope of the position versus time graph.