

Velocity and Speed in 1D



Average **velocity**:

$$\vec{v} = \frac{\Delta x}{\Delta t}$$

x_i, x_f - initial and final positions.

displacement : $\Delta x = x_f - x_i$

travel time : $\Delta t = t_f - t_i$

Average **speed**:

$$v = \frac{d}{\Delta t}$$

d - distance travelled

Problem 1

A rail track running from King Cross to Hogwarts is *240 miles* in length. It takes Thomas the Steam Engine $t_1=3$ hours to get from King Cross to Hogwarts. It takes his fellow steam engine Emily $t_2=4$ hours to cover the same distance.

- What is the speed of each? Express results in mph, km/hr and m/s.
- Now imagine that Thomas and Emily start at the opposite ends of the track (at King Cross, and at Hogwarts). What are their velocities? Assume the direction from King Cross to Hogwarts to be positive.
- Find the time after which the two engines will meet in part (b), if they departed at the same time.

Hint: Start by sketching a doodle for this problem.

Problem 2. Measure the speed of a moving object (toy, rain drop on a window, a pet...). Sketch your experiment, record your data and compute the result (both in the units in which you made your measurements, and in m/s).