Physics 2311 – Physics I

Dr. J. Pinkney

Outline for W2, Day 1

Measurements
- Accuracy vs Precision
- Significant figures
- Errors & error propagation

Motion in 1-D: position, distance, path length, displacement

Homework

Ch. 1 MisConcQs: 2-8,10; Probs:1-8,14,15,17,18, 23,24,54-56 (Due 4 pm Today)

Ch. 2 Prob. 2,3,5-7,14,23-27,35-38,53-56 (Due Wed)

Notes: "week2.pdf" is under "NEW STUFF" now.
Quiz 1 on Fri – on "week1" and Ch. 1.
Try practice quiz on "Units ..."

Physics 2311 – Physics I, Week 2

Dr. J. Pinkney

Outline for Day W2, D2

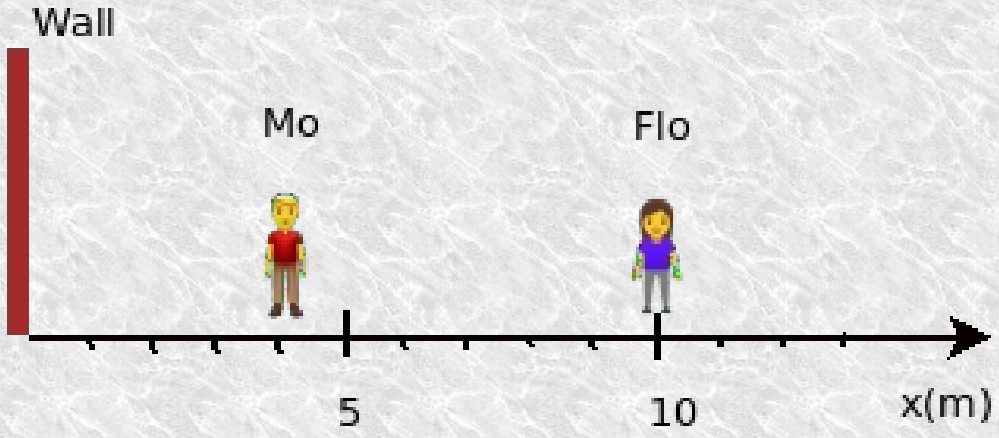
Motion in 1-dimension
- Position, distance, path length, displacement
- Average speed & velocity
- Instantaneous speed & velocity
- Acceleration
  - Equations of uniform acceleration

Homework (Due Wed)
Ch. 2 Prob. 2,3,5-7,14,23-27,35-38,53-56

Notes: Try practice quizzes online.
Quiz 1 on Monday. Mostly Ch 1, and part of Ch. 2 (definitions of l,d,s,v,etc).

Motion in 1-Dimension

Mo and Flo are standing conveniently on a number line, which has its origin, x=0, where the floor meets a wall.

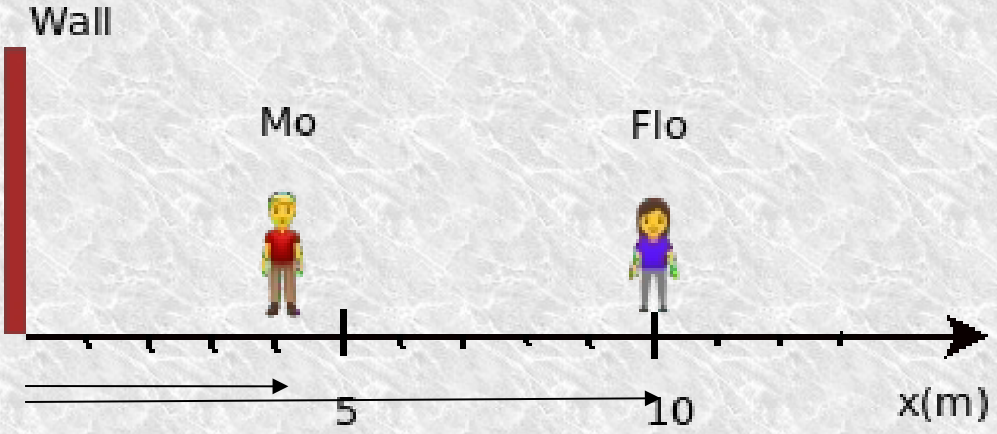


Relative to this origin, we can quantify Mo and Flo's …

Position: the distance away from a reference point.

- Symbols for position: x, y, z
- Positions for Mo and Flo: $x_{mo} = 4$ m and $x_{flo} = 10$ m.

Motion in 1-Dimension (cont.)



Position vector: a vector pointing from a reference point to an object of interest.

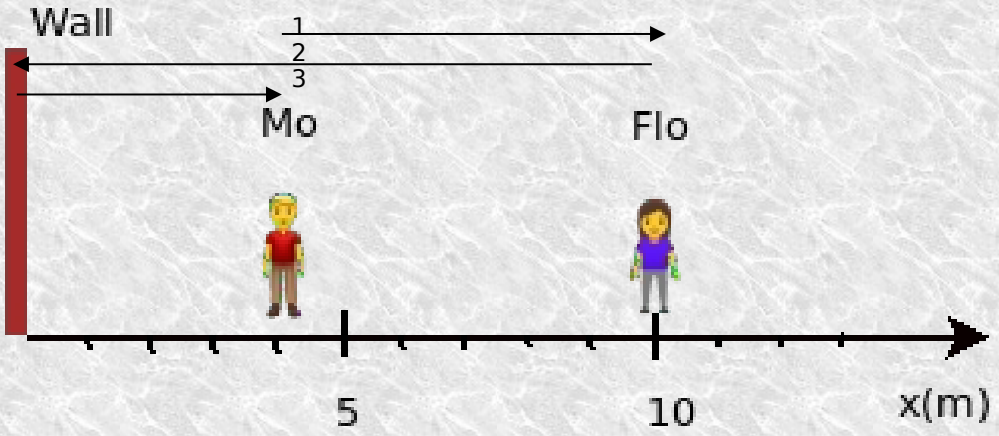
- Symbols for position vector: **x**, **r**
- For Mo and Flo we have $\mathbf{x}_{mo} = 4\,\hat{\imath}\ \text{m}$ and $\mathbf{x}_{flo} = 10\,\hat{\imath}\ \text{m}$.
- The position vectors for Mo and Flo are shown under the numberline.

The **distance** between two objects can be defined as the magnitude of the difference between their positions.

$$d_{\text{flo to mo}} = |x_{mo} - x_{flo}| = |4 - 10| = 6\ \text{m}.$$

Motion in 1-Dimension

Ex) Mo walks to Flo, gets rejected, walks to the wall (x=0), and then returns to x=4.



Path length (d, l): the sum of all distances making up a path.

Ex) Mo's path length (above) is $l = d_1+d_2+d_3 = 6+10+4=20m$

Note: path length is like a cars odometer reading, only increasing.

Displacement ($\Delta\mathbf{x}$, $\Delta\mathbf{y}$, $\Delta\mathbf{r}$): The difference between the final position vector and the initial position vector of a journey.

Ex) Mo's displacement is $\Delta\mathbf{x} = \mathbf{x}_f - \mathbf{x}_i = 4\,\hat{\imath} - 4\,\hat{\imath} = 0\,\hat{\imath}$ m.

Week 2 (cont.)

Motion in 1-Dimension

More “Mo and Flo” examples on black board.

Instantaneous speed, s
Instantaneous velocity, **v** or $\mathbf{v}_{inst}$
Graphing x vs t
  $\mathbf{v}_{inst}$ is slope of x vs t