

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

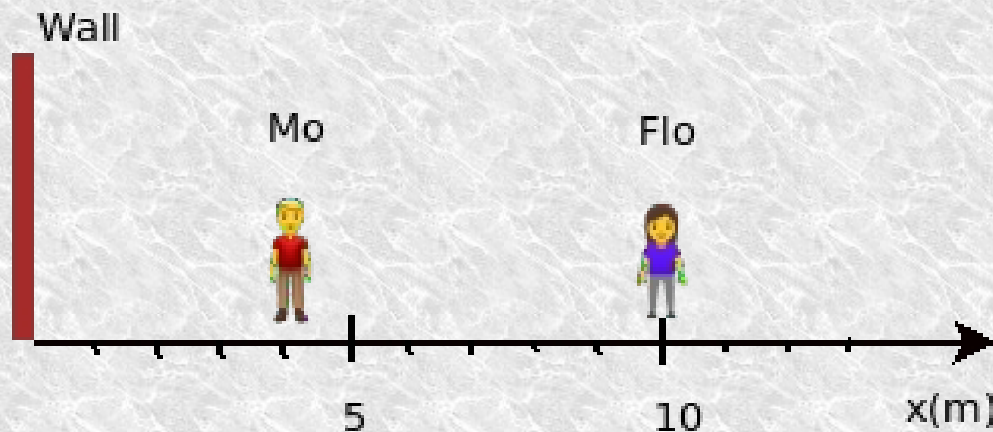
Notes: Try practice quizzes online.

Quiz 1 on Monday on Ch. 1 and $l, d, \Delta x, s, v$.

Hwk 1 not graded yet.

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.

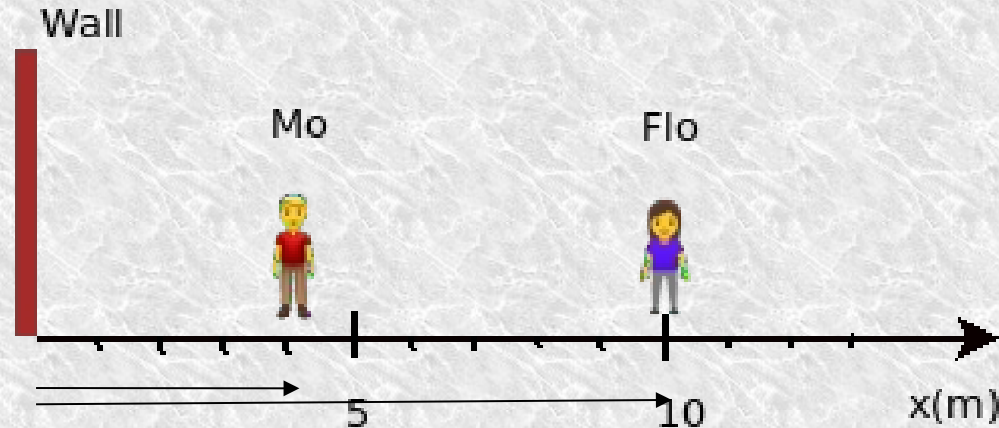


Relative to this origin, we can quantify Mo and Flo's ...

Position: the distance away from a reference point.

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

Motion in 1-Dimension (cont.)



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

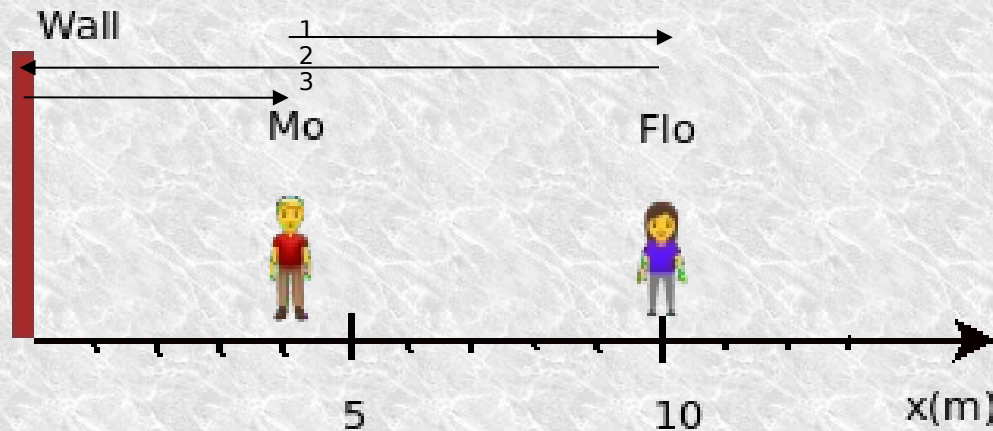
- Symbols for position vector: \mathbf{x} , \mathbf{r}
- For Mo and Flo we have $\mathbf{x}_{\text{mo}} = 4 \hat{i} \text{ m}$ and $\mathbf{x}_{\text{flo}} = 10 \hat{i} \text{ m}$.
- The position vectors for Mo and Flo are shown under the numberline.

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

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

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 $l = d_1 + d_2 + d_3 = 6 + 10 + 4 = 20\text{m}$

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 $\Delta\mathbf{x} = \mathbf{x}_f - \mathbf{x}_i = 4\hat{i} - 4\hat{i} = 0\hat{i}\text{ m}$.

Week 2 3

Motion in 1-Dimension

More “Mo and Flo” examples on black board.

Average speed and velocity

Instantaneous speed, $s = \lim(\Delta t \rightarrow 0) d/\Delta t$

Instantaneous velocity, \mathbf{v} or $\mathbf{v}_{inst} = \lim(\Delta t \rightarrow 0) \Delta \mathbf{x}/\Delta t$

Acceleration, $\mathbf{a}_{avg} = \Delta \mathbf{v}/\Delta t$

\mathbf{a} or $\mathbf{a}_{inst} = \lim(\Delta t \rightarrow 0) \Delta \mathbf{v}/\Delta t$

Graphing

x vs t: \mathbf{v}_{inst} is slope of x vs t

v vs t: \mathbf{a}_{inst} is slope of v vs t

v vs t: $\Delta \mathbf{x}$ is area under v vs t

a vs t: $\Delta \mathbf{v}$ is area under a vs t

Equations of motion: $x = x_0$, $x = x_0 + v_0 t$, $x = x_0 + v_0 t + \frac{1}{2} a t^2$

Equations of uniform acceleration. See “Ch. 2 example probs.”

Physics 2311 – Physics I, Week 23

Dr. J. Pinkney

Outline for Day W3, D1

Quiz 1

Motion in 1-dimension

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:

Hwk 1 mean = 9.15/10 Checked P.6,23.

See online key.

Use tutoring, my office hours

Physics 2311 – Physics I, Week 23

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Outline for Day W3, D2

Return Quiz 1 (mean = 6.71/9)

Motion in 1-dimension

Inst. speed and velocity from functions

Acceleration

Equations of uniform acceleration

Homework (Due Wed → Friday)

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

Notes: This week's Lab = Graphs and Motion

Hwk 1 mean = 9.15/10 Checked P.6,23.

See online key.

Use tutoring, my office hours

Physics 2311 – Physics I, Week 23

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Outline for Day W3, D3

Return Quiz 1

Motion in 1-dimension

Equations of motion

Equations of uniform acceleration

Free fall Motion

Homework (Due today by 3 pm)

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

Ch. 3 P. 1,3,6,7,10,11,19,20,23,24,
32,33,37,38,39 Due Fri

Notes: Next week's Lab = Accel of gravity

Public Astronomy Event 8:30-10:30, Obsvtry

Tutoring last night?