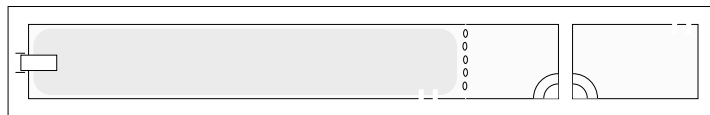


PHYZ SPRINGBOARD: THIS WAY & THAT WAY I

POSITION & DISPLACEMENT

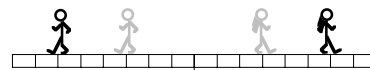


1. Both little people in the diagram to the right are 5m from the origin.
- a. How can we distinguish the **position** of the dude from that of the dudette? For example, we cannot say each is at a place called "5m," since that would suggest they're in the same place.



- b. What is the meaning of "positive position"?
- c. What is the meaning of "negative position"?
- d. What is the meaning of "zero position"?
- e. On a number line, +5m is considered a **greater** value than -5m. Is a position of +5m nearer, farther, or equally distant from the origin compared to a position of -5m?

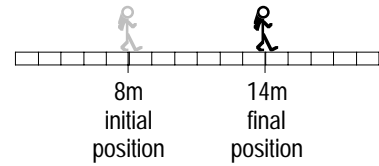
2. Both little people in the diagram to the right moved 3m.
- a. How can we distinguish the **displacement** (change in position) of the dude from that of the dudette? For example, we cannot say each had a displacement of "3m," since that would suggest they moved the same way.



- b. What is the meaning of "positive displacement"?
- c. What is the meaning of "negative displacement"?
- d. What is the meaning of "zero displacement"?
- e. Who moved **farther**: dude or dudette? Does the sign (+/-) of a displacement indicate something about its size or its direction?
- f. The previous question suggests a difference between the concepts of **distance** and **displacement**. What is that difference?

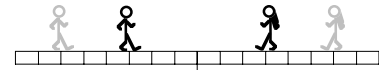
g. Which is **larger**: a displacement of +3m or a displacement of -4m? Justify your answer.

3. a. In terms of "initial position" (x_1) and "final position," (x_2) what is the **mathematical** definition of displacement (Δx)?

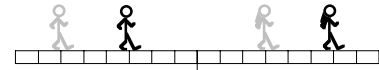


b. Label x_1 , x_2 , and Δx in the diagram above to the right and calculate the Dude's displacement.

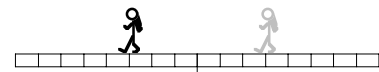
c. What are the displacements of the dude and the dudette in the diagram to the right? Write mathematical solutions.



d. What are the displacements of the dude and the dudette in the diagram to the right? Write mathematical solutions.



e. What is the displacement of the dudette in the diagram to the right? Write a mathematical solution. (Careful: you know it's not zero!)



f. What relationship—if any—is there between the sign of position and the sign of displacement? Select the correct statement from the choices below.

- The sign of position indicates the sign of displacement.*
- The sign of position is opposite the sign of displacement.*
- There is no relationship between the sign of position and the sign of displacement.*

4. A number line could be drawn vertically as well as horizontally. In the vertical case, positive and negative displacements would involve moving up and down instead of left and right. With this in mind, what is true of **all** bodies that undergo

a. positive displacement? (Hint: consider what happens to the **value** of the position.)

b. negative displacement?