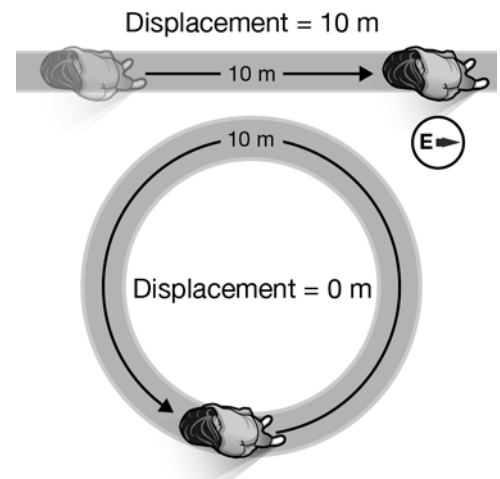


2E Displacement

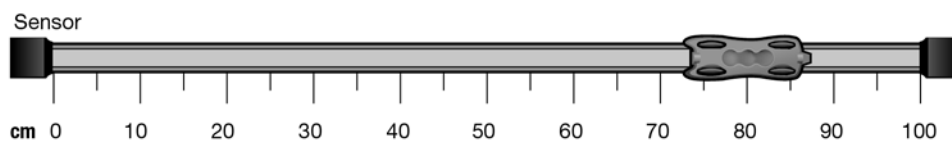
Read:

Displacement and distance are two different variables. Displacement is a change in position. For example, you can walk 10 meters end up at a place that is 10 meters east of your starting point. In this case, you would be displaced 10 meters. However, you might also walk 10 meters in a circle and end up where you started. In this case you would be displaced 0 meters! But, in both cases the distance you traveled would be 10 meters.



Example:

In the car-and-track system below, the origin is defined at the sensor-end of the track. When the car moves away from the origin, it has a positive displacement. When the car moves toward the origin, it has a negative displacement. Suppose the car begins at the 80-cm mark. Where would it be if it is displaced by -60 cm?



Looking for Position of car	Solution new position = $80 \text{ cm} + (-60 \text{ cm}) = 20 \text{ cm}$ The new position of the car is 20 cm.
Given Current position = 80 cm Displacement = -60 cm	
Relationship new position = current position + displacement	

Practice:

1. If the car in the car-and-track system on page 1 moved -40 cm from its starting position at 80 cm and then $+15$ cm, what would be its new position on the track?

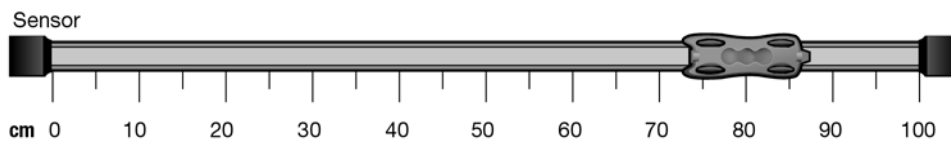
Looking for	Solution
Given	
Relationships	

2. Now imagine that the car is on a rectangular track that is 30 cm on each short side and 60 cm on each long side. The car begins at the 0 cm position and takes one trip around the track.

a. What is the displacement of the car?

b. What is the total distance that the car travels?

3. The car on a track begins at the 80 -cm mark. The car moves in the negative direction at a speed of 5 cm/s.



After three seconds,

a. What distance has the car traveled?

b. What is the displacement of the car?

c. What is the car's new position on the track?

- 4. The displacement of a quarterback and his team after a play is - 20 yards.
 - a. Does this mean the play was good or bad for the team? Explain your answer.

- b. After the next play, the team only needs to move the ball a distance of 10 yards to make a touchdown. When that play happens, the wide receiver ends up running a distance of 30 yards, but he still makes a touchdown and his displacement is 10 yards from where he began. How is this possible?
