Kinematics

Studies _______________ without thinking about its _______________

**Position (x)**

The _______________ where something is relative to a _______________ system called a _______________.

The most common coordinate system the _______________ coordinate system.

**Displacement (Δx)**

The change in position _______________.

Has _______________ and _______________.

Path does _______________ matter.

Only _______________ and _______________ position matters.

What is the displacement of the path in the diagram?

[Diagram of a vector representing displacement]

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**Distance**

The _______________ of the path traveled.

Has only _______________.

You drive 20 km east, then turn around and drive 15 km west. What is your displacement?

What was your distance?
**Homework**

1. How are distance and displacement the same? How are they different?
2. How are scalars and vectors the same? How are they different?
3. Classify each measurement as a scalar or vector.
   - (a) _____ 20 books on a shelf
   - (b) _____ A car travels 25 km east
   - (c) _____ A plane flies 500 km
   - (d) _____ The car drives 100 km/h west
   - (e) _____ The plane flies 200 mph north
   - (f) _____ In an experiment, a toy car moves −15 cm
   - (g) _____ In an experiment, a mouse moves +20 cm
   - (h) _____ The temperature is −5 °C
4. The road I live on goes east and west. One day, my family and I decide to go west to the beach. I travel 2 miles west when my wife realizes we passed a flock of wild turkeys. I turn around and drive back 1/2 miles before we find the turkeys. What is my displacement at the flock of turkeys (make west negative)? (RW) **-1.5 miles**
5. What is the distance I traveled to where I stopped by the turkeys? (RW) **2.5 miles**
6. Find the following for path A in the diagram: (a) The distance traveled. (b) The magnitude of the displacement from start to finish. (c) The displacement from start to finish. (OpenStax 2.1) **7 m, 7 m, 7 m**
7. Find the following for path B in the diagram: (a) The distance traveled. (b) The magnitude of the displacement from start to finish. (c) The displacement from start to finish. (OpenStax 2.2) **5 m, 5 m, -5 m**
8. Find the following for path C in the diagram: (a) The distance traveled. (b) The magnitude of the displacement from start to finish. (c) The displacement from start to finish. (OpenStax 2.3) **13 m, 9 m, 9 m**
9. Find the following for path D in the diagram: (a) The distance traveled. (b) The magnitude of the displacement from start to finish. (c) The displacement from start to finish. (OpenStax 2.4) **8 m, 4 m, -4 m**