Let $x_1$ and $x_2$ be the positions of an object at time $t_1$ and $t_2$. Then its displacement, denoted by $\Delta x$, in time $\Delta t = (t_2 - t_1)$, is given by the difference between the final and initial positions.

So, Displacement = $\Delta x = x_2 - x_1$ ……[1]

(We use the Greek letter delta ($\Delta$) to denote a change in a quantity.)

- If $x_2 > x_1$ , $\Delta x$ is positive; and if $x_2 < x_1$ , $\Delta x$ is negative. If $x_2 = x_1$ , $\Delta x$ is zero. Thus displacement can be positive, negative or zero.

## Comparison of Distance and Displacement

1. The magnitude of the displacement for a course of motion may be zero but the corresponding path length is not zero
2. The displacement of a moving body can be positive (+ve), negetive (-ve) or zero but the distance travelled by a body is always positive (+ve).
2. The value of displacement may increase or decrease but the value of distance always increases.
3. The magnitude of displacement is less than or equal to the distance travelled by the body in same time interval.

   i.e. **| displacement | < distance**

Both can be equal only if the body moves in the same direction throughout.