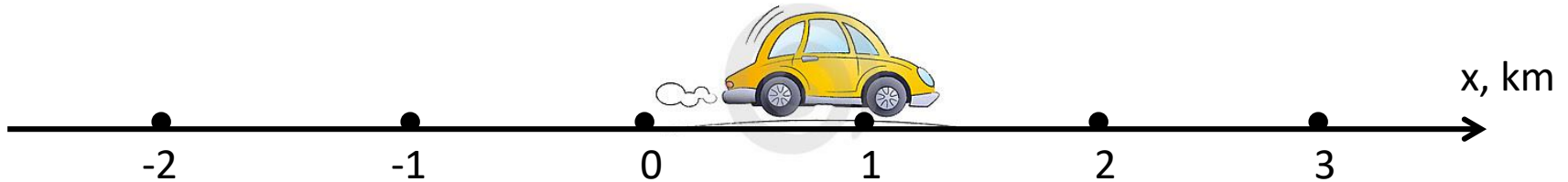


# Distance and displacement in 1D



## *Distance:*

$$d = |\Delta x| = |x_f - x_i|$$

The distance is just a measure of length. It can only be positive or zero.

$x_f \rightarrow$  final position in  $x$  axis.

$x_i \rightarrow$  initial position in  $x$  axis.

## *Displacement:*

$$\Delta x = x_f - x_i$$

The displacement tells us the length **and** direction of a movement. Its sign matters!

In science, the Greek letter  $\Delta$  usually represents the change or difference of a quantity. For example,  $\Delta t$  would represent the change in time between two events.

# Homework 4

## Problem 1.

A straight walkway connects a house with a beach. A dog named Einstein runs along that walkway towards the beach with speed 4 m/s, for 5 minutes. After that, the dog turns back and runs for another 10 minutes with speed 3m/s. Find:

- a) The total distance travelled,  $d$ .
- b) The total displacement of the dog,  $\Delta x$ . Let the positive direction be towards the beach.
- c) Average *speed* of the dog.

## Problem 2

A Lion rest under a palm tree somewhere near the Earth's equator.

- a) Find the speed of the Lion due to the Earth's spin about its axis. Express the result in m/s, using scientific notation. Assume that the circumference of the Earth is  $C=40,000\text{km}$ .