CONCEPT: INTRODUCTION TO VECTORS AND SCALARS

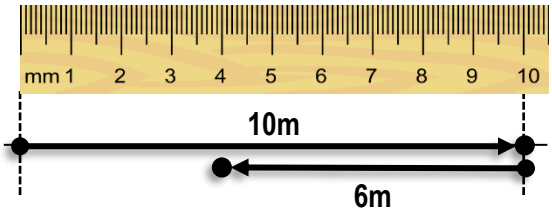
- When we take measurements, you always get the _____ (size of measurement). [*Example*: ***60°F, 10kg***]
  - SOME measurements *also* have _____. [*Example*: ***10m right, 20 miles/hr NORTH***]
  - Measurements *with* direction are **[Vectors | Scalars];** measurements *without* direction are **[Vectors | Scalars]**

Measurement	**Quantity**	Magnitude?	Direction?	Vector/Scalar
"Apple weighs 5kg"	Mass			**[Vector | Scalar]**
"Days are 24hr long"	Time			**[Vector | Scalar]**
"It's 60°F outside"	Temperature			**[Vector | Scalar]**
"I pushed with 100N left"	Force			**[Vector | Scalar]**
"I walked for 10 ft"				**[Vector | Scalar]**
"I walked 10 ft. east"				**[Vector | Scalar]**
"I drove at 80 mph"				**[Vector | Scalar]**
"I drove 80mph west"				**[Vector | Scalar]**

CONCEPT: DISPLACEMENT VS. DISTANCE

● There are two similar-sounding words to measure **how FAR** something moves (Length):

DISTANCE (d)

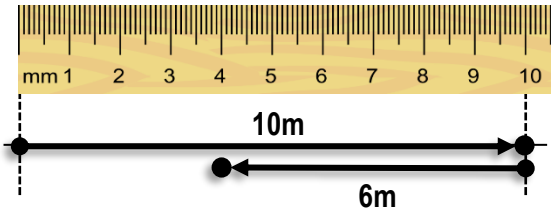


- _____ of all lengths traveled

$d =$ _____ → **Scalar (Magnitude *only*)**

_____ = _____

DISPLACEMENT ($\Delta\vec{x}$)

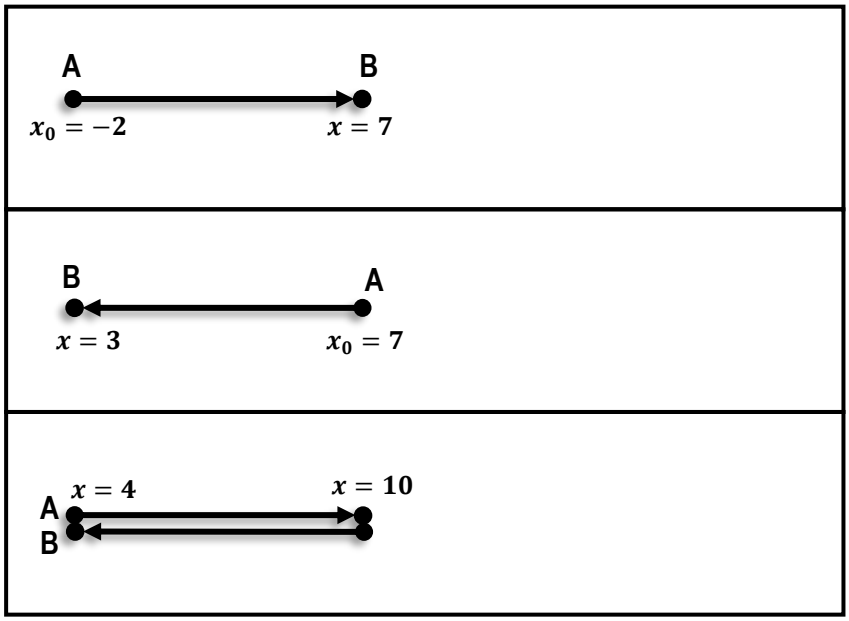


- _____ in position (___)
- _____ between initial & final position

$\Delta x =$ _____ → **Vector (Mag. + Dir.)**

_____ = _____

EXAMPLE: Find the displacement and total distance traveled from **A** to **B** for each of the following situations:



● Displacements can sometimes be negative, but distances are *ALWAYS* positive.

- In Physics, **(+ / –)** signs are usually used to indicate direction!

PRACTICE**:** Starting from a pillar, you run 140m east (the +x-direction), then turn around**. (a)** How far west would you have to walk so that your total distance traveled is 300m? **(b)** What is the magnitude and direction of your total displacement?