

CONCEPT: INTRODUCTION TO VECTORS AND SCALARS

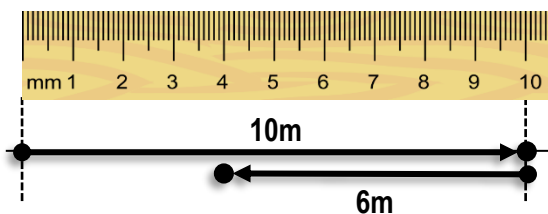
- When we take measurements, you always get the _____ (size of measurement). [*Example: 60°F, 10kg*]
 - SOME measurements *also* have _____. [*Example: 10m right, 20 miles/hr NORTH*]
 - Measurements with direction are [**Vectors** | **Scalars**]; measurements without direction are [**Vectors** | **Scalars**]

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)

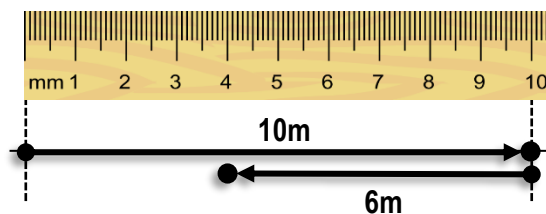


- _____ of all lengths traveled

$d = \text{_____} \rightarrow \text{Scalar (Magnitude only)}$

$$\text{_____} = \text{_____}$$

DISPLACEMENT (Δx)



- _____ in position (_____)

- _____ between initial & final position

$\Delta x = \text{_____} \rightarrow \text{Vector (Mag. + Dir.)}$

$$\text{_____} = \text{_____}$$

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

A $x_0 = -2$ $\rightarrow$ B $x = 7$
B $x = 3$ $\leftarrow$ A $x_0 = 7$
A $x = 4$ $\rightarrow$ B $x = 10$

- 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?