

# Physics Notes

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# 1 Displacement

- **Displacement** can be described as an object's change in position relative to a reference frame, and can be expressed mathematically as follows:

$$\Delta x = x_f - x_0$$

## 1.1 Example

A cyclist rides 3 km west and then turns around and rides 2 km east. (a) What is her displacement? (b) What distance does she ride? (c) What is the magnitude of her displacement?

1. Her displacement is -1:

$$\Delta x = x_f - x_0; \Delta x = -1 - 0; \Delta x = -1 \text{ km}$$

2. She traveled 5 kilometers:

$$3 \text{ km} + 2 \text{ km} = 5 \text{ km}$$

3. The magnitude of her displacement is 1:

$$|-1| = 1$$

## 2 Vectors, Scalars, and Coordinate Systems

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