

## Key Motion Terms

Use the glossary to find the definitions of the following:

Position; Distance, Displacement, Speed, Velocity, Acceleration & Time.

Average Speed = Distance/Time

$$v_{sp} = \frac{d}{t}$$

Average Velocity = Displacement/Time

Vector symbol →

$$\vec{v}_{avg} = \frac{\vec{d}_f - \vec{d}_o}{t}$$

final pos.      initial pos.

## Calculating Distance, Displacement, Average Speed & Average Velocity

A car drives 20 km [E], 45 km [W], 35 km [W] and finally 80 km [E]. All of this happens in 5 hours.

a) Calculate the distance traveled. *\*Direction does not matter.*

$$d = 20 + 45 + 35 + 80 = \boxed{180 \text{ km}}$$

b) Calculate the car's final position. *\*Direction matters!*

$$\begin{array}{c} -W \longleftarrow \longrightarrow E + \\ \vec{d} = 20 - 45 - 35 + 80 = \boxed{20 \text{ km [E]}} \\ \quad \quad \quad \swarrow \text{West} \end{array}$$

c) Calculate the car's average speed.

$$v_{sp} = \frac{d}{t} = \frac{180 \text{ km}}{5 \text{ hr}} = \boxed{36 \frac{\text{km}}{\text{h}}}$$

d) Calculate the car's average velocity.

$$\vec{v}_{avg} = \frac{\vec{d}_f - \vec{d}_0}{t} \quad \leftarrow \vec{d} \text{ displacement (change in position)}$$

$$\vec{v}_{avg} = \frac{20 \text{ km}}{5 \text{ hr}} = \boxed{4 \text{ km/h [E]}}$$

## Calculating Distance, Displacement, Average Speed & Average Velocity

A car drives 120 km [S], 75 km [N], 55 km [S] and finally 25 km [N]. This happens in 3 hours.

- Calculate the distance traveled. (275 km)
- Calculate the car's final position. (-75 km [N])
- Calculate the car's average speed. (92 km/h)
- Calculate the car's average velocity. (-25 km/h [N])

## Attachments

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