Concept: ***Speed***

"AVERAGE" SPEED - the total distance traveled divided by the time spent traveling the total distance.

➔ $speed = \dfrac{\text{distance}}{\text{time}}$ Speed is a **scalar** with units of $\dfrac{m}{s}$.

In the language of Mathematics:

$\bar{v} = \dfrac{d}{t}$ *or* $d = \bar{v}t$ $\bar{v} = v$ **if the speed is constant**

where

$\bar{v}$ = average speed
d = distance
t = time

Concept: ***Velocity***

"AVERAGE" VELOCITY - the total net change in position divided by the time spent making the position change.

➔ $velocity = \dfrac{\text{displacement}}{\text{time}}$ Velocity is a **vector** with units of $\dfrac{m}{s}$.

In the language of Mathematics:

$\bar{\mathbf{v}} = \dfrac{\Delta x}{\Delta t}$ *or* $\bar{\mathbf{v}} = \dfrac{x_f - x_i}{t_f - t_i}$ $\bar{\mathbf{v}} = \mathbf{v}$ **if the velocity is constant**

where

$\bar{\mathbf{v}}$ = average velocity
Δx = displacement (x_f = final position value: x_i = initial position value)
Δt = change in time (t_f = ending time value: t_i = starting time value)

Concept: ***Acceleration***

"AVERAGE" ACCELERATION - the change in velocity during a given time interval.

➔ $acceleration = \dfrac{\text{change in velocity}}{\text{elapsed time}}$ Acceleration is a **vector** with units of $\dfrac{m}{s^2}$.

In our language of mathematics:

$\bar{\mathbf{a}} = \dfrac{\Delta v}{\Delta t}$ *or* $\bar{\mathbf{a}} = \dfrac{v_f - v_i}{t_f - t_i}$ $\bar{\mathbf{a}} = \mathbf{a}$ **if the acceleration is constant**

where

$\bar{\mathbf{a}}$ = average acceleration
Δv = change in velocity (v_f = final velocity value: v_i = initial velocity value)
Δt = change in time (t_f = ending time value: t_i = starting time value)