

Physics Notes

by

Nada Saab, Ph.D.

<http://nhsaab.weebly.com>

Week 3

Chapter 1. Simple Motion

1.8 Average Speed and Average Velocity (P2.1E, P2.1G)

a) Average Speed

For any motion, the average speed is the distance for the time interval divided by the length of the time.

$$\text{average speed} = \text{total distance} / \text{time interval}$$

Formula of Average Speed	Derivatives of the Formula
$\text{Average speed} = \frac{\text{Distance}}{\text{Elapsed time}}$	a) Distance = (Average Speed) x (Time) or b) Time = (Distance) / (Average Speed)

Speed is a **scalar** quantity.

A speed of 80 km/h means the the object moves 80 km every one hour (80 is the magnitude, km/h is the unit kilometer/hour).

SI units for speed: meters per second (m/s) or km/h

What to do?

1. Study sample problem below 1 and 2
2. Do practice exercises numbers 1.
3. Show your work and submit.
4. Answers are shown below (in blue) to verify your work.

Sample Problems:

1. What is the speed of a train that travels a distance of 480 km in 8.0h?

$$\begin{aligned}\text{Average Speed} &= \text{Distance} / \text{Time} \\ &= 480 / 8 \\ &= 60 \text{ km/h}\end{aligned}$$

2. How far does a jogger run in 1.5 hours (5400 s) if his average speed is 2.22 m/s?

$$\begin{aligned}\text{Average Speed} &= \text{Distance} / \text{Time} \\ &\text{or} \\ \text{Distance} &= (\text{Average Speed}) \times (\text{Time}) \\ &= (2.22) \times (4500) \\ &= 12000\text{m}\end{aligned}$$

Practice:

1. Suppose a car travels with uniform motion from a position of 2.0 km[N] to a position of 20 km[S] in 0.5h. Find the car's:
- a) displacement,
 - b) velocity,
 - c) distance travelled and
 - d) speed.

In this case (+) will be used for north and (-) will be used for south.

Answers:

- a) - 22 km or 22 km [S],
- b) - 44 km/h or 44 km/h [S]
- c) 22 km
- d) 44 km/h