

Average Speed Practice Problems

Problem solving Method

1. Draw A diagram of the problem (motion diagram, force diagram)
2. List what you are given and what you are trying to find.
3. Write the Equation that relates these quantities.
4. Do the math
5. Write your answer, with units.

1. What is the average speed of a dog that runs 500. m in 30. seconds? _____

$$\bar{s} = \frac{\Delta d}{\Delta t} = \frac{500}{30} = 16.7 \text{ m/s}$$

2. In the 1988 Summer Olympics, Florence Griffith-Joyner won the 100 m race in 10.54 s. What was her average speed? _____

$$s = \frac{\Delta d}{\Delta t} = \frac{100}{10.54} = 9.49 \text{ m/s}$$

3. On May 29, 1988, Rick Mears won the Indianapolis 500 in 3.45 hours. What was his average speed during the 500 mile race in mph? _____

$$s = \frac{\Delta d}{\Delta t} = \frac{500}{3.45} = 145 \text{ mph}$$

4. The peregrine falcon is the world's fastest known bird and has been clocked diving downward toward its prey at a constant vertical speed of 97.2 m/s. If the falcon dives straight down from a height of 100.0 m, how much time does the rabbit below have to find a safe hiding place?

$$v = \frac{d}{T}$$

$$97.2 = \frac{100}{T}$$

$$97.2 T = 100$$

$$T = \frac{100}{97.2} = 1.03 \text{ sec}$$

5. A jogger runs 200. m in 60 seconds then runs 1600. m in 600. seconds and finally sprints 200. m in 20 seconds. What is the jogger's average speed? _____

d	T
200	60
1600	600
200	20
<hr style="width: 50%; margin: 0 auto;"/>	<hr style="width: 50%; margin: 0 auto;"/>
2000	680

$$\bar{s} = \frac{\Delta d}{\Delta t} = \frac{2000}{680} = 2.94 \text{ m/s}$$

6. A physics student drives a car at 40 km/hr for 2 hours and then 60 km/hr for another 2 hours. What was the average velocity of the physics student? _____

S	T	
40 km/hr	2 hrs	= 80
60 km/hr	2 hrs	= 120
100	4	<u>200</u>

$$S = \frac{d}{T} = \frac{200}{4} = 50 \text{ km/hr}$$

7. An automobile travels 30 mi/hr for half an hour, 55 mi/hr for one hour and 45 mi/hr for 15 minutes (.25 hr.) What is the automobile's average speed? _____
 (Hint: Find total distance and total time first)

S	T	d
30	1/2	15
55	1	55
45	.25	11.25
	<u>1.75</u>	<u>81.25 miles</u>

$$S = \frac{d}{T}$$

$$\bar{S} = \frac{81.25}{1.75}$$

$$S = 46.4 \text{ mph}$$

8. Two physics teachers challenge each other to a 100 m race across the football field. The loser will grade the winner's papers for one month. Mr. Einstein runs the race in 10.4 seconds. Mr. Fermi runs the first 25 m with an average speed of 10 m/s, the next 50 m with an average speed of 9.5 m/s and the final 25 m with an average speed of 11.1 m/s. Who gets stuck grading the physics papers?

$$d = v \cdot t \Rightarrow T = \frac{d}{v}$$

FERMI

d	v
25	10
50	9.5
25	11.1

<u>T = d/v</u>
2.5 sec
5.26 sec
2.25 sec
<u>10.01 sec</u>

FERMI FINISHES 0.4 SECONDS ahead of EINSTEIN

- Answers: 1) 16.7 m/s 2) 9.49 m/s 3) 145 mph 4) 1.03 sec 5) 2.94 m/s
 6) 50 km/hr 7) 46.4 mph 8) Einstein