

SMD Physics
E Linear motion (I) - Speed

1. What is the impact speed when a car moving at 100km/h bumps into the rear of another car travelling in the same direction at 98km/h?
2. Harry Hotshot can paddle a canoe in still water at 8km/h. How successful will he be at canoeing upstream in a river that flows at 8km/h?
3. Is a fine for speeding based on one's average speed or instantaneous speed?
4. What is the average speed in kilometres per hour for a horse that gallops a distance of 15km in 30min?
5. How far does a horse travel if it gallops at an average speed of 25km/h for 30min?
6. A car moves with a constant speed of 90km/h. How far does it get in 10s?
7. How long does it take a car to drive from Hannover to Stuttgart in Germany (620km) when its average speed is 80km/h?
8. A rider canters at a steady 10m/s around a field, from A to B and then to C.
 - a) What total distance does she cover?
 - b) How long does this take her?
 - c) What is her average speed?
 - d) What is her average speed (m/s and km/h) if it takes her 70s to ride from A directly to C?
9. It takes the driver of a car 6 minutes to drive the 5km from his house to the freeway. On the freeway, he drives 20km in 10 minutes. Afterwards he drives 7 more kilometres in 6 minutes on a narrow road.
 - a) Calculate the three different speeds.
 - b) Calculate the average speed.

10. The driver of a car travels 15 minutes to the freeway which is 10km away. After driving two hours on the freeway at a constant of 100km/h, he drives 20km in 25 minutes on a rural road. How much is his average speed for the whole trip?
11. On a winter's day, you watch a railway worker hitting the rail with a hammer, 750m away from you. In order to hear it better you put your left ear on the rail. When do you hear the sound with your left ear (through the iron), when with your right ear (through the air)? [speed of sound: iron 4900m/s; air 333m/s].
12. You see a struck of lightning 1700m away from you. After 5 seconds you hear the thunder. Calculate the speed of sound.
13. The average distance from the Earth to the Sun is 149'600'000 km. The speed of light is approximately 300'000 **km/s**. Calculate the time it takes for a sunray to travel from the Sun to the Earth.
14. A plane flies 600km away from its base at 200km/h, then flies back to its base at 300km/h. What is its average speed?
15. The ocean's level is currently rising at about 1.5mm per year. At this rate, in how many years will sea level be 3 meters higher than now?