

## Honors Physics 1D Kinematics HW, part 1 (Homework)

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1.

A person takes a trip, driving with a constant speed of 99.0 km/h except for a 20.0 min rest stop. If the person's average speed is 71.5 km/h, how much time is spent on the trip and how far does the person travel?

2.

In order to qualify for the finals in a racing event, a race car must achieve an average speed of 250 km/h on a track with a total length of 1600 m. If a particular car covers the first half of the track at an average speed of 225 km/h, what minimum average speed must it have in the second half of the event in order to qualify?

3.

A car traveling in a straight line has a velocity of +9.0 m/s at some instant. After 8.0 s, its velocity is +12.0 m/s. What is its average acceleration in this time interval?

4.

A certain car is capable of accelerating at a rate of + 0.70 m/s<sup>2</sup>. How long does it take for this car to go from a speed of 30 mi/h to a speed of 60 mi/h?

5.

A racing car reaches a speed of 40 m/s. At this instant, it begins a uniform negative acceleration, using a parachute and a braking system, and comes to rest 5.0 s later.

(a) Determine the acceleration of the car.

(b) How far does the car travel after acceleration starts?

6.

A truck on a straight road starts from rest accelerating at 2.0 m/s<sup>2</sup> until it reaches a speed of 20 m/s. Then the truck travels for 20 s at constant speed until the brakes are applied, stopping the truck in a uniform manner in an additional 5.0 s.

(a) How long is the truck in motion?

(b) What is the average velocity of the truck for the motion described?

7.

An electron moving in a straight line has an initial speed of  $3.0 \times 10^5$  m/s. It undergoes an acceleration of  $9.0 \times 10^{14}$  m/s<sup>2</sup>.

(a) How long will it take to reach a speed of  $8.8 \times 10^5$  m/s?

(b) How far will it have traveled in this time?

8.

A record of travel along a straight path is as follows:

1. Start from rest with constant acceleration of  $2.07 \text{ m/s}^2$  for  $18.0 \text{ s}$
2. Constant velocity for the next  $2.80 \text{ min}$
3. Constant negative acceleration  $8.14 \text{ m/s}^2$  for  $5.15 \text{ s}$

- (a) What was the total displacement for the complete trip?
- (b) What were the average speeds for legs 1, 2, and 3 of the trip as well as for the complete trip?

9.

A car accelerates uniformly from rest to a speed of  $55.0 \text{ mi/h}$  in  $9.0 \text{ s}$ .

- (a) Find the distance the car travels during this time and
- (b) the constant acceleration of the car.