

Physics 112: Position and Velocity Review

1. Define speed and velocity. Explain the difference between speed and velocity.
2. Define distance and displacement. Explain the difference between distance and displacement.
3. Suppose you are in a car traveling west at 35 km/h; relative to you, what is the velocity of the following cars (velocities given are relative to the ground)?
  - a. A car in front of you is driving 50 km/h [W].
  - b. A truck in front of you is driving 15 km/h [E].
4. Suppose you drive to school with an average velocity of  $v$  and in a time  $t$ .
  - a. Another student drives the same route but it takes one-third the time. Compared to you, how many times faster, or slower, was this student's average velocity?
  - b. Yet another student drives the same route averaging one-fifth your velocity. Compared to you, how many times shorter, or longer, did it take this student to get to school?
5. A race car drives around a 4km oval track exactly 3 times in 144s. Would the average velocity and the average speed be the same? Explain why using the distinction between scalars and vectors. Calculate the average velocity and the average speed in km/h.
6. Calculate the time it takes to drive a distance of 715 m when averaging a speed of 21 m/s.
7. Calculate the distance travelled by an object travelling at a speed of 95km/h in a time of 45 minutes.

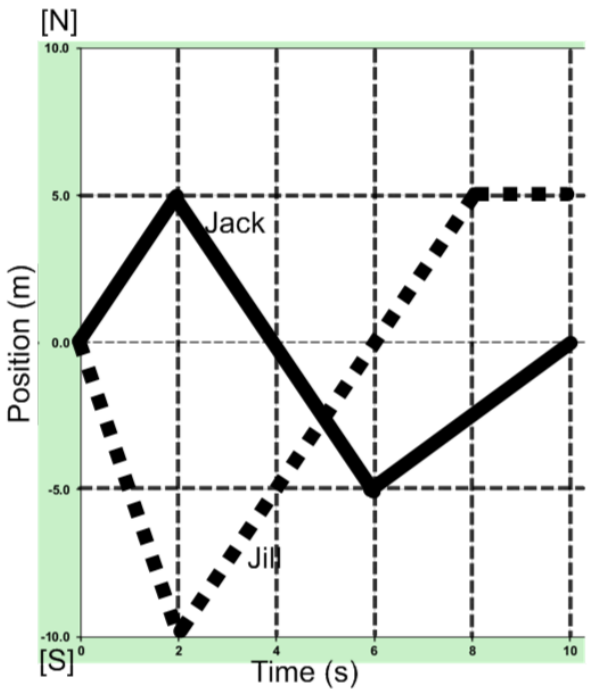
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8. A football is thrown 59 m [E], 35 m [E], 112 m [W], 89 m [E], and 46 m [W]. All of this happens in 86 seconds.
- Calculate the football's average speed.

- Calculate the football's average velocity.

9. A car drives 50km/h [S] for 0.5 hours, then 90km/h [S] for 1.5 hours, then 100km/h [N] for 2 hours. Calculate the average speed and average velocity of the car.

10. For the remainder of the test use the graph below:



- Calculate Jack's velocity during the last 2 seconds.
- At what time(s) did each person return to the starting position?
- Calculate Jack's average velocity between 2 and 10 seconds.
- At what time(s) did Jill change directions?
- Who had the fastest and slowest instantaneous speed? Calculate their speeds.

- Calculate the average velocity for each person for the entire 10 seconds.

- Calculate the average speed for each person for the entire 10 seconds.