

RECAP the Average Velocity / Average Speed –Problem 1

- In the qualifying round of the 50-yd freestyle in the sectional swimming championship, Dugan got an early lead by finishing the first 25.00 yd in 10.01 seconds. Dugan finished the return leg (25.00 yd distance) in 10.22 seconds.
- Determine Dugan's average speed for the entire race.
 - Determine Dugan's average speed for the first 25.00 yd leg of the race.
 - Determine Dugan's average velocity for the entire race.

- a. 2.472 yd/s
b. 2.498 yd/s
c. 0 yd/s

Equations of motion – Problem 2

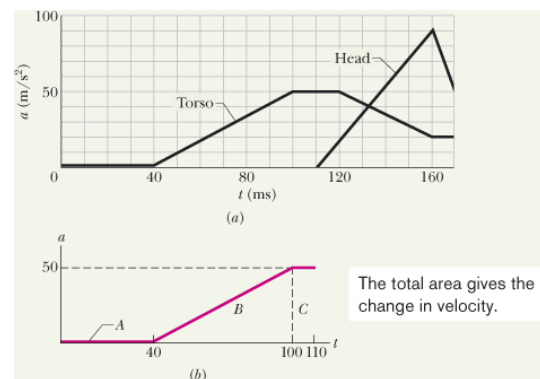
During the annual shuffleboard competition, Renee gives her puck an initial speed of 9.32 m/s. Once leaving her stick, the puck slows down at a rate of -4.06 m/s^2 .

- Determine the time it takes the puck to slow to a stop.
 - Use your initial speed and the calculated time to determine the average speed and the distance which the puck travels before stopping.
- a. 2.30 s
b. 10.7 m

Book Problem 2.9 – Problem 3

"Whiplash injury" commonly occurs in a rear-end collision where a front car is hit from behind by a second car. In the 1970s, researchers concluded that the injury was due to the occupant's head being whipped back over the top of the seat as the car was slammed forward. As a result of this finding, head restraints were built into cars, yet neck injuries in rear-end collisions continued to occur.

In a recent test to study neck injury in rear-end collisions, a volunteer was strapped to a seat that was then moved abruptly to simulate a collision by a rear car moving at 10.5 km/h. The figure next slide gives the accelerations of the volunteer's torso and head during the collision, which began at time $t = 0$. The torso acceleration was delayed by 40 ms because during that time interval the seat back had to compress against the volunteer. The head acceleration was delayed by an additional 70 ms. What was the torso speed when the head began to accelerate?



Answer: 7.2 Km/hr

Challenge-Problem 4

A car is behind a truck going 25m/s on the highway. The car's driver looks for an opportunity to pass, guessing that his car can accelerate at 1.0m/s^2 . He gauges that he has to cover the 20 m length of the truck, plus 10 m clear room at the rear of the truck and 10 m more at the front of it. In the oncoming lane, he sees a car approaching, probably also traveling at 25 m/s. He estimates that the car is about 400 m away. Should he attempt to pass?

