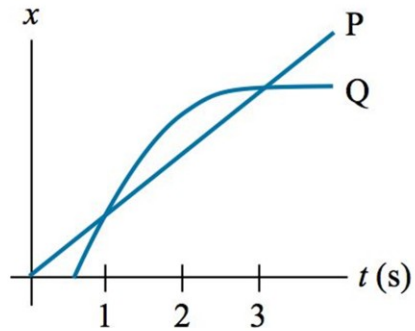


1/22/14

Masses P and Q move with the position graphs shown. Do P and Q ever have the same velocity? If so, at what time or times?



- A. P and Q have the same velocity at 2 s.
- B. P and Q have the same velocity at 1 s and 3 s.
- C. P and Q have the same velocity at 1 s, 2 s, and 3 s.
- D. P and Q never have the same velocity.

Answer: A The slope of a position vs. time graph indicates the velocity. If you look at line Q, it has the same slope as P only at the 2 second mark.

Acceleration vs. Velocity

- Which car has a higher velocity?

A



B



C. Not enough information

A is traveling at 100 mph while B is traveling at 63 mph.

Acceleration vs. Velocity

- Which car has a greater acceleration?

A



B



C. Not enough information

C. Not enough information Can't see how quickly the speedometers are moving.

Boat Race

Two sail boats decide to race across a 60 km wide lake. Boat A travels at 60 km/hr across and back. Boat B travels across at 30 km/hr, sees they're behind and travels at 90 km/hr on the return trip.

- Who wins?
- Find the net displacement
- Find the average velocity of each boat.



Boat Race

Who Wins?

- A. Boat A (60 km/hr)
- B. Boat B (30 km/hr then 90 km/hr)
- C. It's a tie

Kinematics equations

$$(v_x)_f = (v_x)_i + a_x \Delta t$$

$$x_f = x_i + (v_x)_i \Delta t + \frac{1}{2} a_x (\Delta t)^2$$

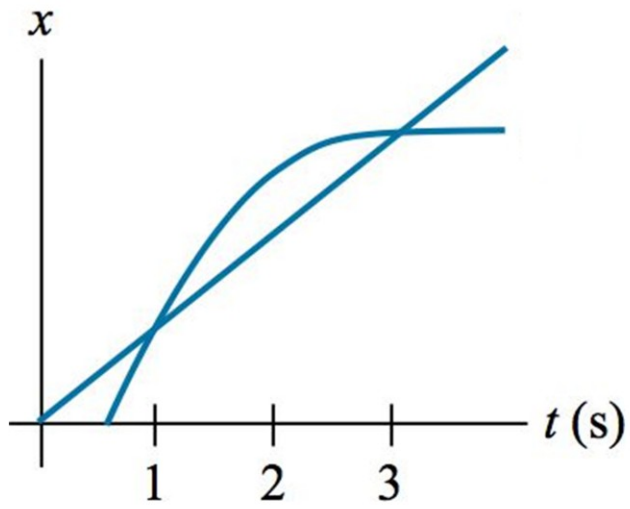
$$(v_x)_f^2 = (v_x)_i^2 + 2a_x \Delta x$$

Soccer Pass

You're playing soccer with a friend. You both start at the same point. You take off at a steady run, then after half a second, she kicks the ball at you (it rolls on the ground). It goes right past you at 1 second, then rolls to a stop. After about 3 seconds you jog past the stationary ball.

Draw a position vs. time graph for this scenario.

Soccer Pass



Soccer Pass

Let's say you were traveling at 5 m/s while running down field for 3.0 seconds.

The ball started at 13 m/s and slowed to a stop in 2.0 seconds.

- a) find the distance you traveled in 3.0 s
- b) Find the distance the ball traveled.
- b) what is the acceleration of the ball?