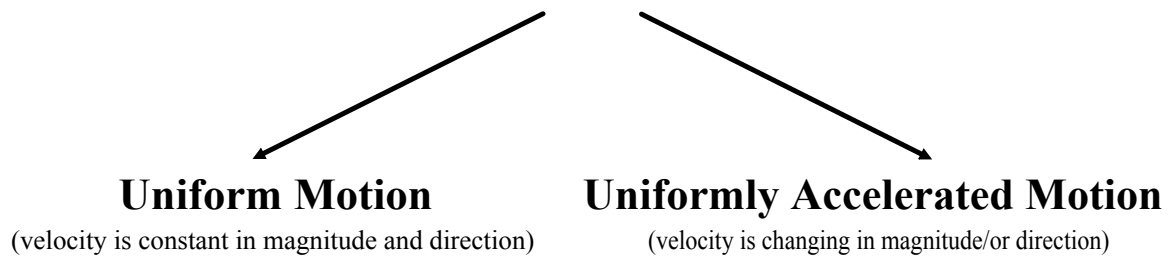


Types of Motion



Constant, Average and Instantaneous Velocity

Uniform Motion (Constant Velocity): the velocity of an object remains constant.

Constant Velocity means magnitude and direction remain constant.

Non-Uniform Motion: means that the velocity is changing, either in magnitude or in direction.

Question: A physics book is moving across a table. Can the book have a

a) constant speed and a changing velocity?

b) constant velocity and a changing speed?

Question 2: A race car is travelling at a constant speed around a race track. Is this considered uniform motion?

1. Constant velocity: object travels the same distance for each unit of time.

When graphed on a displacement-time graph, it produces a straight diagonal up or down OR a straight horizontal line.

The slope of the graph equals the velocity.

2. Average velocity: is the ratio of the total displacement to the total time. If in the case of constant velocity it is also the average.

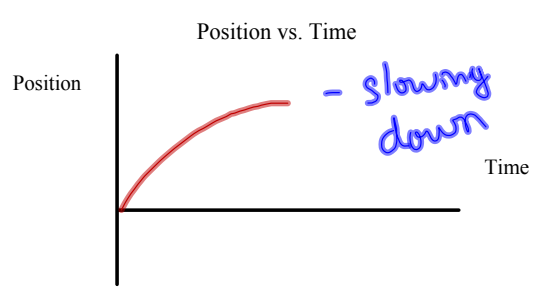
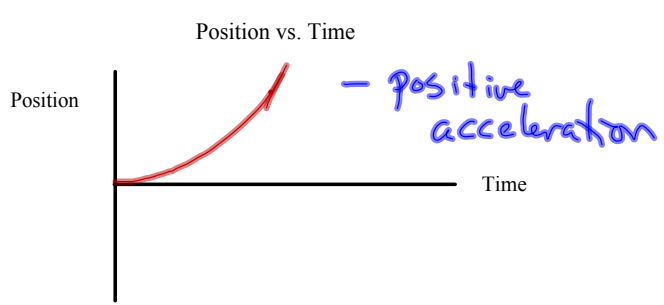
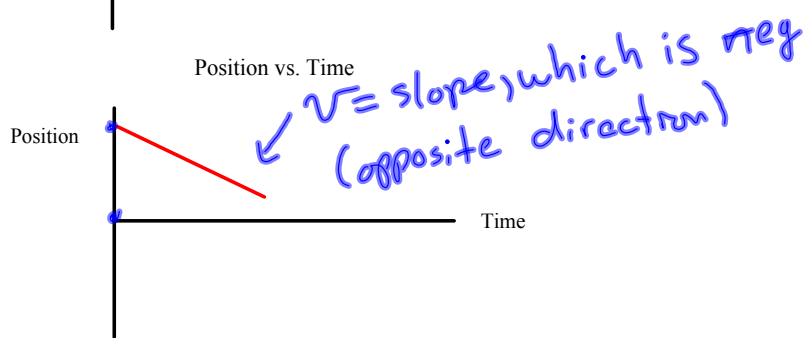
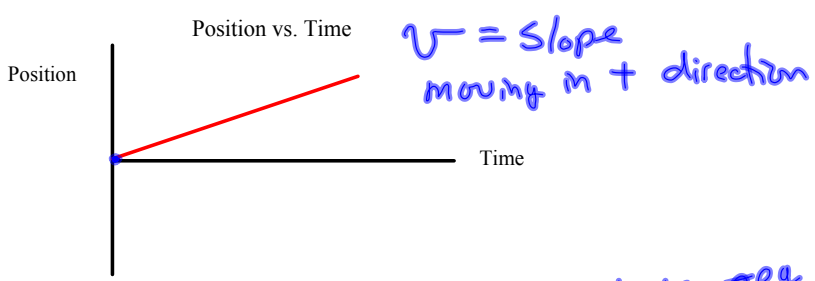
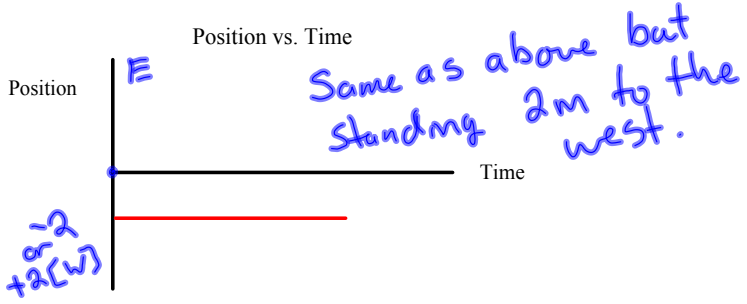
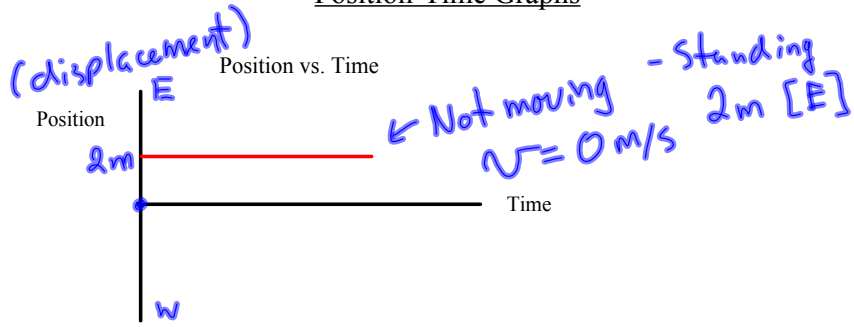
When graphed on a displacement-time graph, the slope of the line of best fit is equal to the average velocity.

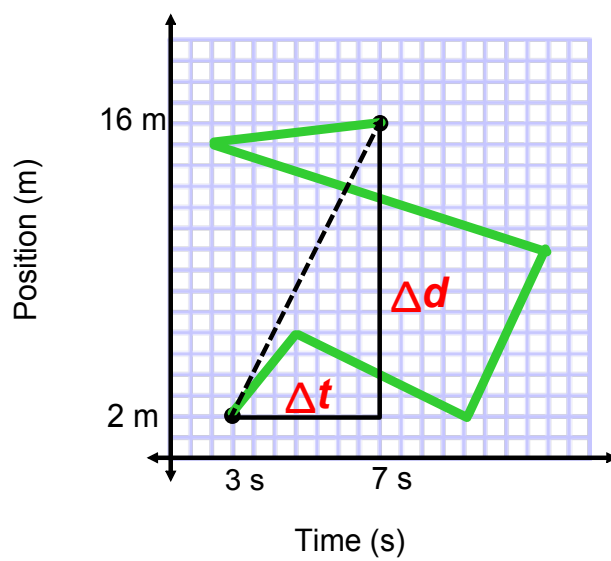
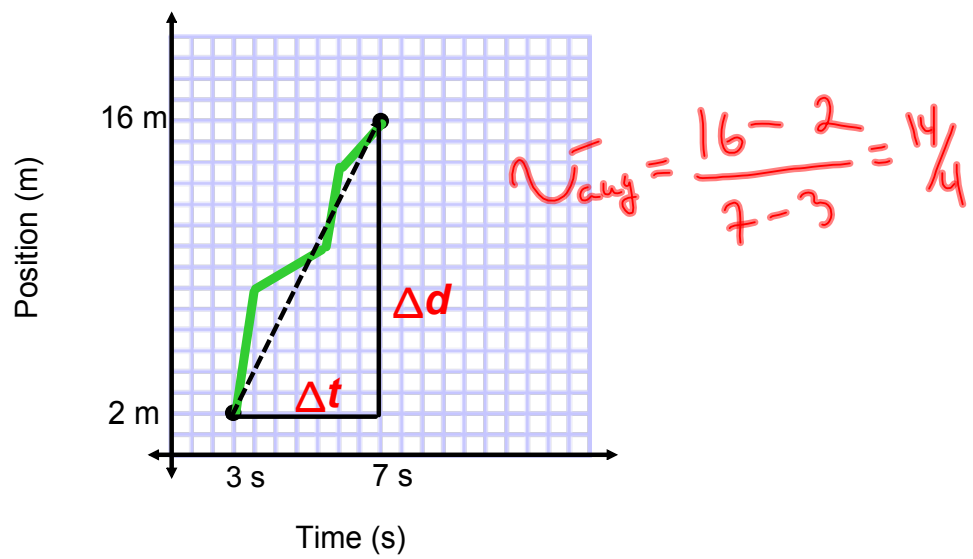
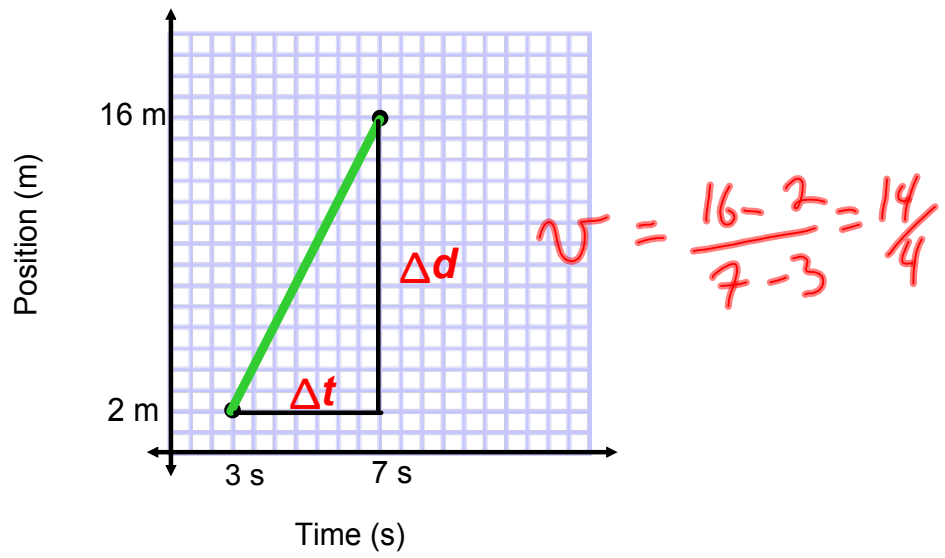
3. Instantaneous velocity: the velocity of an object at one instant of time.



To find its value from a displacement-time graph, the slope of the tangent at that instant of time must be found

Position-Time Graphs



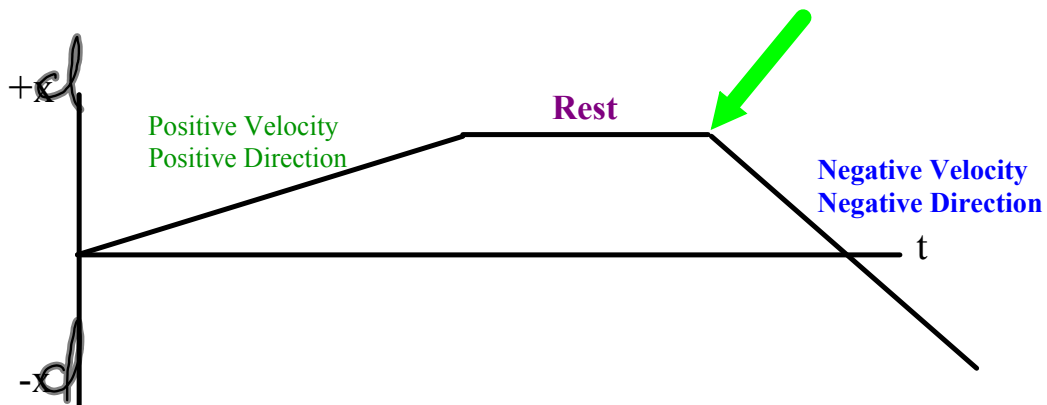


Worksheet: Interpreting D-T Graphs

Position-Time Graphs

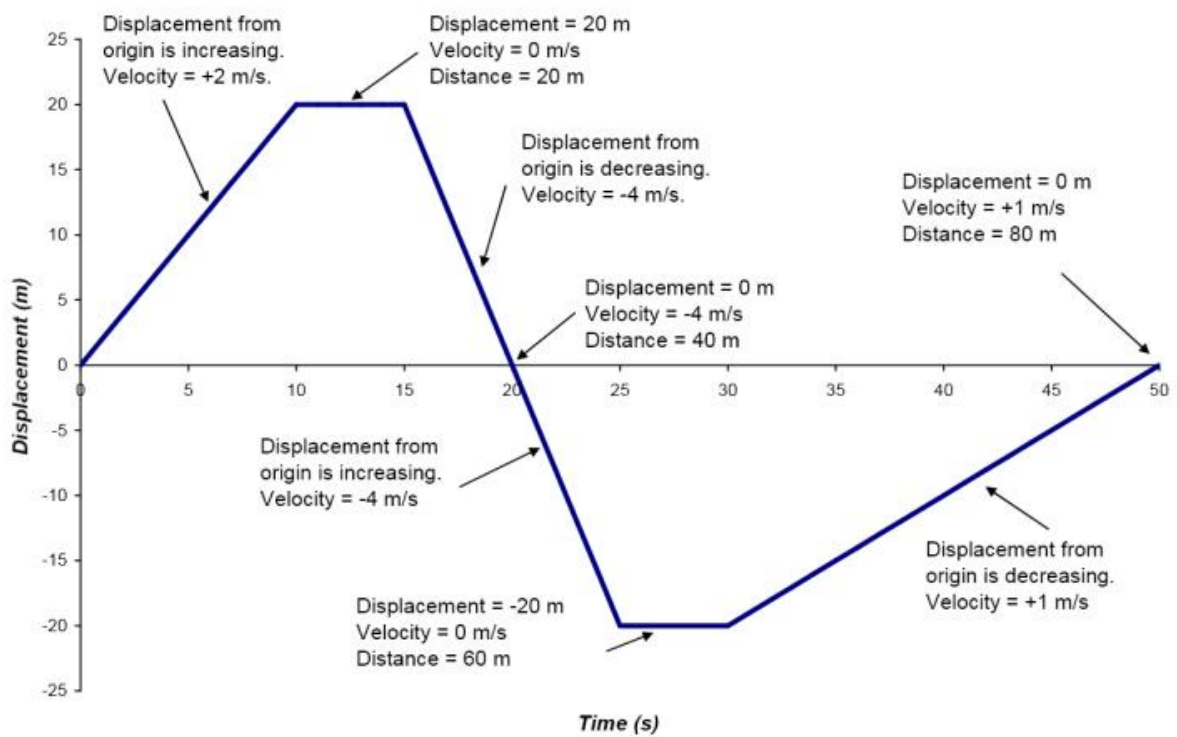
Direction of Motion

If the velocity of an object changes from positive to negative (or vice versa) it simply means that it has changed direction. On a position-time graph this occurs when the velocity changes signs.

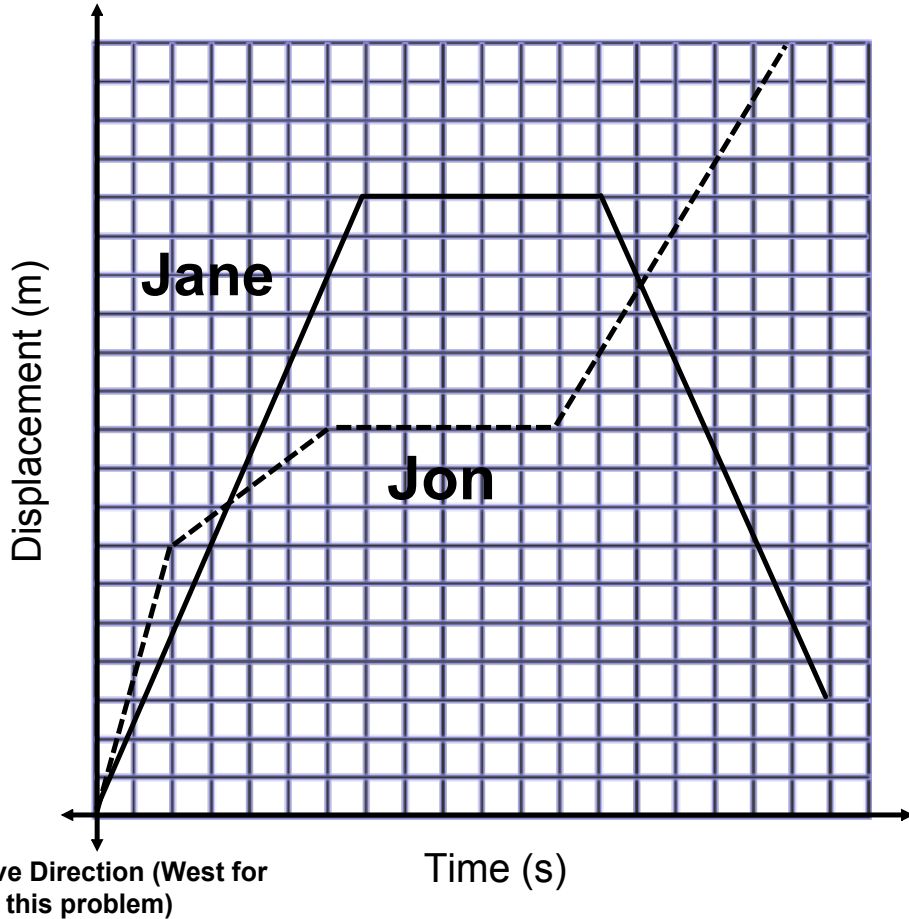


Physics 112: Displacement and Velocity

D-T Graph Analysis

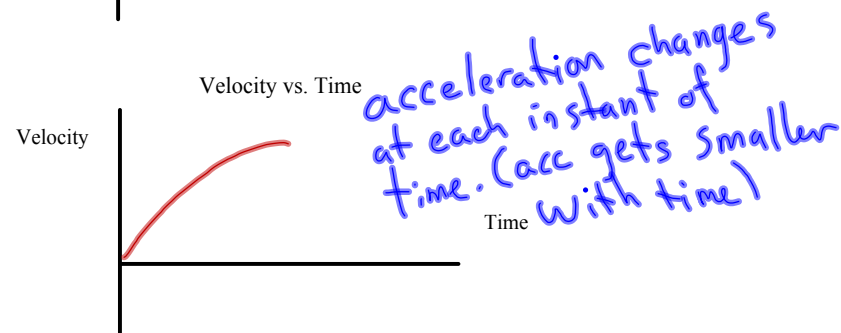
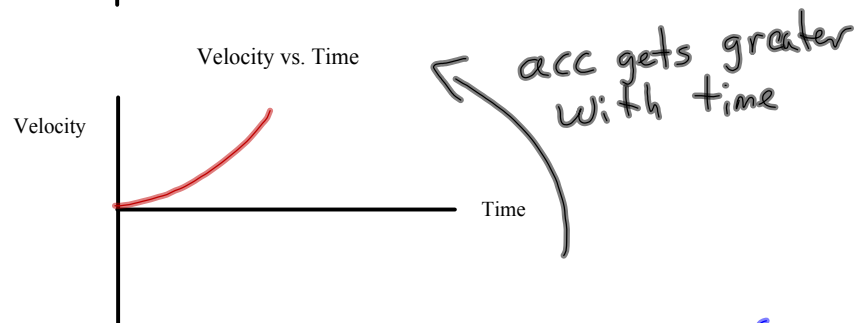
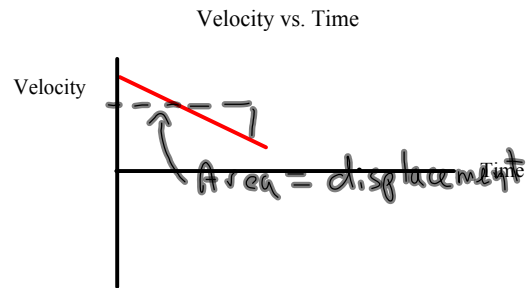
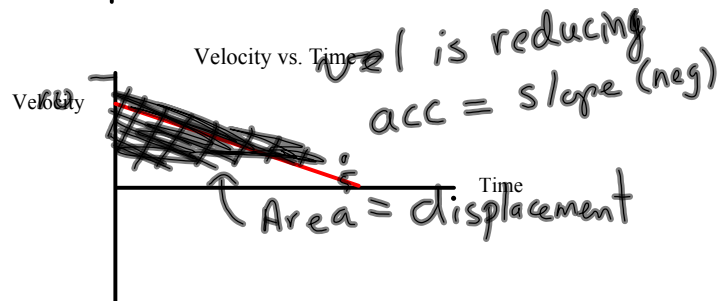
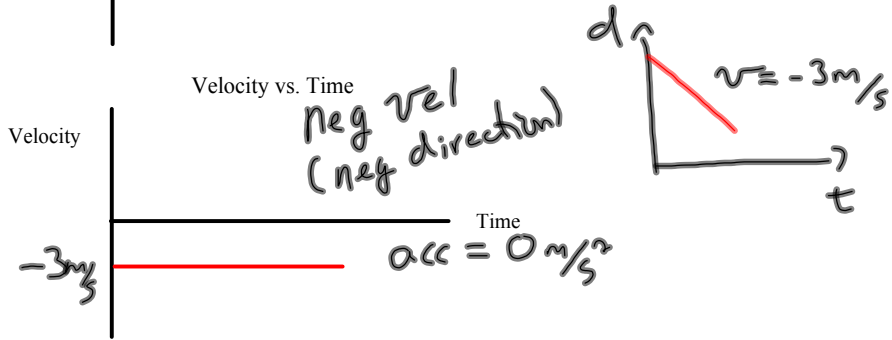
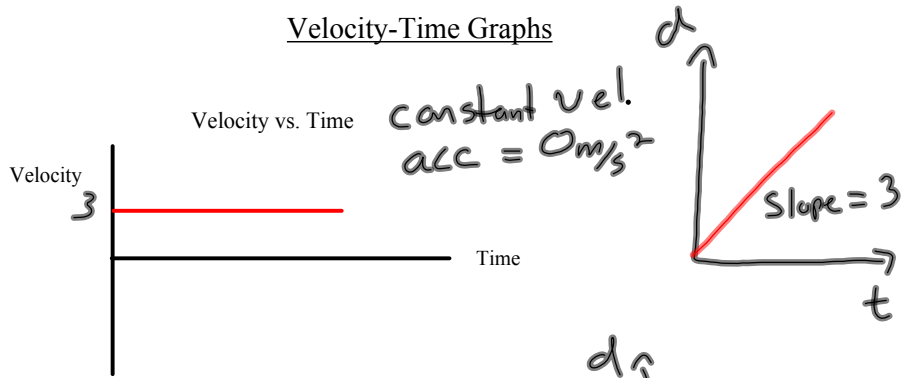


Displacement Practice
Positive Direction (East for this problem)



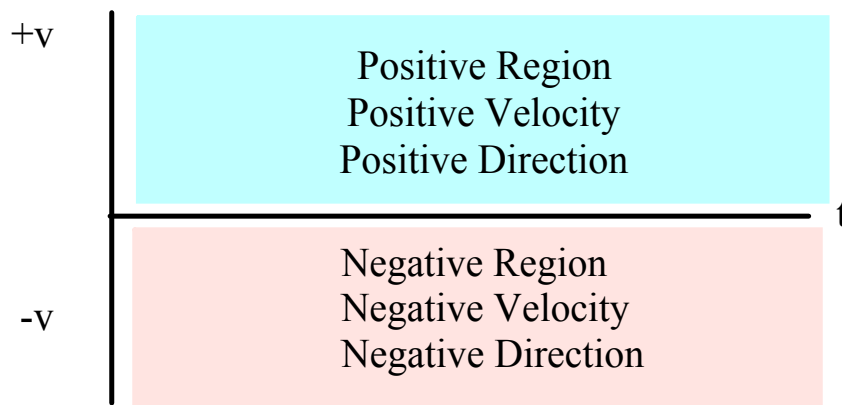
- What initial velocity did each person start off with? (Jane: 2.3 m/s [E]; Jon 3.5 m/s [E])
- What was the final velocity of each person? (Jane 2.2 m/s [W]; Jon 1.7 m/s [E])
- How long after the start did Jane start moving west? (13 seconds)
- At what time were both people at the same location? (14 seconds)
- What was the total distance traveled by each person? (Jane 29 m; Jon 20 m)
- What was the final displacement of each person? (Jane 3 m [E]; Jon 20 m [E])
- What was Jon's instantaneous speed at the 5.33 s mark? (0.75 m/s)
- What was each person's average velocity for the entire trip? (Jane: 0.016 m/s [E]; Jon: 1.1 m/s [E])
- What was each person's average speed for the entire trip? (Jane: 1.5 m/s; Jon: 1.1 m/s)

Velocity-Time Graphs



Velocity-Time Graphs

Direction of Motion



If the graph line crosses over the time axis from the positive region to the negative region (or vice versa), then the object has changed directions.

Physics 112: Displacement and Velocity

V-T Graph Analysis

