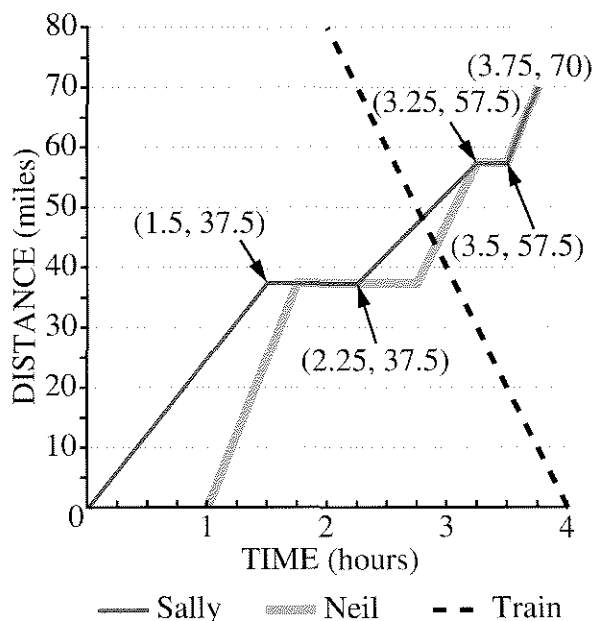


4.A The Bicycle Trip

Sally is riding her bike on a trip with her bicycle club. She left the staging area in Chapley at 10 A.M. and took a break at a rest area located about halfway to the final destination of Berkhill, 70 miles away. Neil is driving the sweep vehicle, a van with food, water, first aid, and a bicycle rack. The distance-time graph below shows their progress. There are train tracks along the road. The progress of a train is also shown on the graph.



- Compare Sally's and Neil's progress. Who left first? Where did she or he stop? What happened at the end? What was the total distance covered?
- Including the origin, the coordinates of six points on Sally's graph are given. Describe her ride between consecutive points.
 - At what time did each leg of her trip start and end? How far did she ride each time? How long did it take? How long were her breaks?
 - How fast was she going during each leg of the trip?
- If you were to guess about which part of the trip was downhill or uphill, what would you guess? Why?

- How else might one account for the different speeds?
- How fast did Neil drive in each leg of his trip?
 - Describe the train's progress. Which way was it going? Where and when did it pass Sally and Neil?
 - Where were Sally, Neil, and the train at 12:30 P.M.?
 - At what times were Sally, Neil, and the train 20 miles from the staging area?
 - The equation of the train's motion is $D = 160 - 40t$.
 - Choose three points on the train's graph and check that their coordinates satisfy the equation.
 - Do any points in Sally's and Neil's graphs satisfy the train's equation? If so, which ones?

9. Summary

- In a distance-time graph, what does it mean if two points are on the same horizontal line? On the same vertical line?
- As you go from left to right on the graph, what is the meaning of a part that goes up? Down? What is the meaning of a horizontal segment? Why is a vertical segment impossible?
- What is the significance of a point that belongs to the motion graphs of two different people?

10. Report

Tell the story of the bicycle trip. Use information you gathered from the graph. Make guesses about the trip. Include a graph for Irva, another member of the bicycle club. She too left at 10 A.M. and stopped at the rest area.