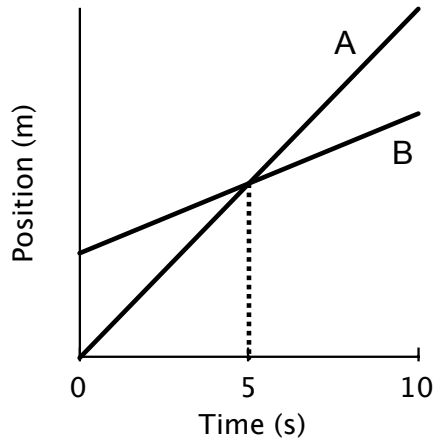
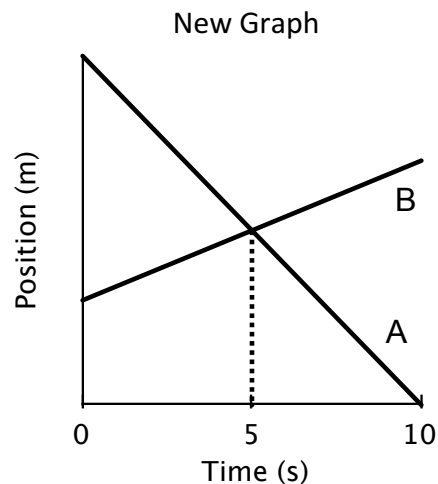
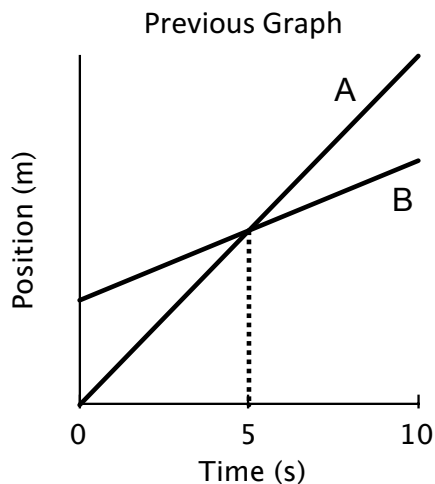


## Worksheet 2-2 Position-Time Graphs

1. Consider the position vs. time graph below for cyclists A and B.



- Do the cyclists start at the same point? How do you know? If not, which is ahead?
  - At  $t = 7$  s, which cyclist is ahead? How do you know?
  - Which cyclist is travelling faster at  $t = 3$  s? How do you know?
  - Are their velocities equal at any time? How do you know?
  - What is happening at the intersection of lines A and B?
2. Consider the new position vs. time graph below for cyclists A and B.



- How does the motion of the cyclist A in the new graph compare to that of A in the previous graph?
- How does the motion of cyclist B in the new graph compare to that of B in the previous graph?
- Which cyclist has the greater speed? How do you know?
- Describe what is happening at the intersection of lines A and B.
- Which cyclist traveled a greater distance during the first 5 seconds? How do you know?

- 1a. No. The starting point is given by the intercept with the position axis. Rider B starts ahead of rider A.
  - 1b. At  $t = 7$  s, which is to the right of  $t = 5$  s on the graph, the graph for rider A is above that of rider B therefore rider A is ahead.
  - 1c. Speed is given by the slope of the line. The graph of rider A has a greater slope than that of rider B therefore rider A is traveling faster.
  - 1d. Straight lines have a constant slope. The slope of the line for rider A is always greater than the slope of the line for rider B therefore rider A is always traveling faster and they are never going the same speed.
  - 1e. The intersection of the two lines represents the two riders being in the same place at the same time.
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- 2a. In the new graph, cyclist A is traveling at the same speed as before but in the opposite direction.
  - 2b. The motion of cyclist B does not change from the previous graph.
  - 2c. Cyclist A has the greater speed because the magnitude of the slope for cyclist A is greater than the slope for cyclist B.
  - 2d. The intersection of the two lines represents the two riders being in the same place at the same time.
  - 2e. Cyclist A traveled a greater distance than cyclist B in the first 5 seconds. This can be seen by examining the graph and seeing that the change in position of rider A is greater than the change in position of rider B.