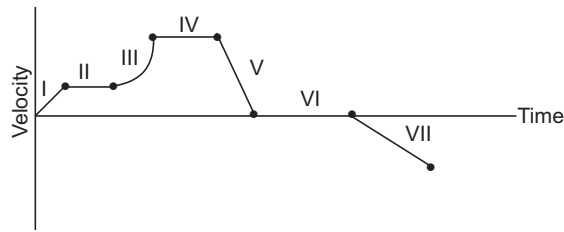
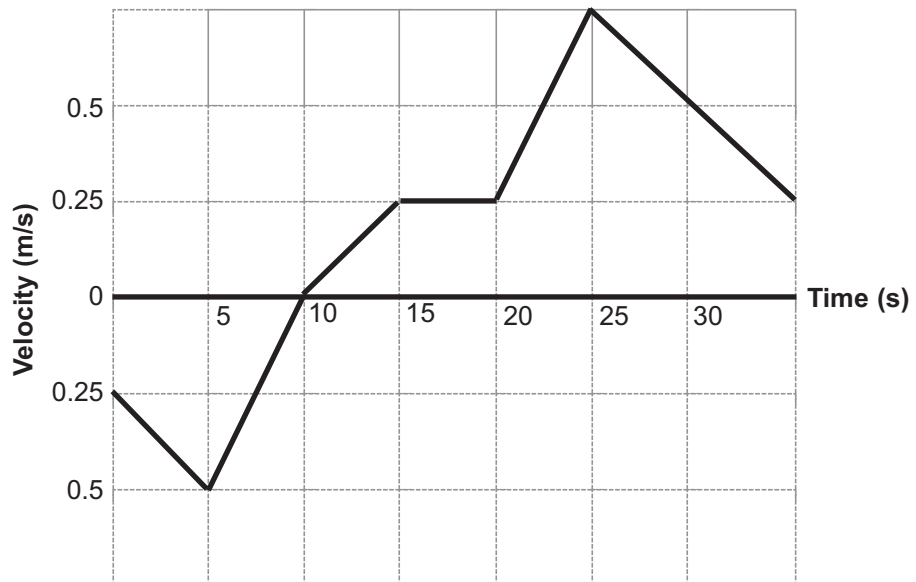


SLA

 Student
Learning
Activity

Appendix 3.10: Kinematics: Position, Velocity, and Acceleration Graphs


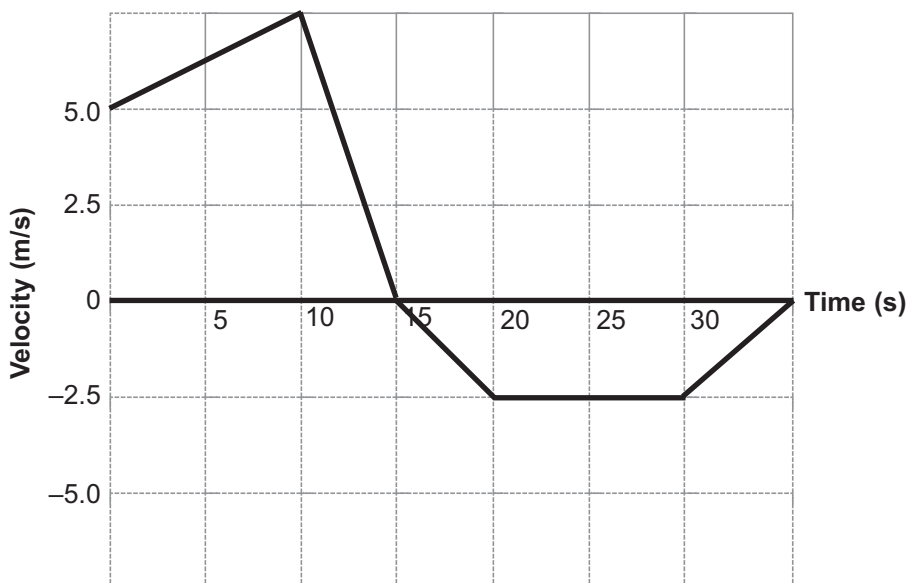
1. The graph above represents the velocity as a function of time for an object that is moving back and forth along a straight line.
 - a) For each interval:
 - i) indicate whether the velocity is positive, negative, or zero.
 - ii) indicate whether the velocity is steady, increasing at a steady rate, increasing at a rate that is not steady, decreasing at a steady rate, decreasing at a rate that is not steady.
 - iii) indicate whether the acceleration is positive, negative, or zero.
 - b) Over which interval would the object travel through the greatest distance? Assume that each segment of the graph lasts for the same amount of time. Explain your answer.



2. For the graph of velocity-time given above, plot a graph of position-time.
 - a) Make a table indicating how the positions were calculated. At $t = 0$ s, $x = 3.0$ m.
 - b) Plot the graph of position-time.



3. For the velocity-time graph used in Question #2 on the previous page, plot a graph of acceleration-time.
 - a) Make a table showing how the acceleration was calculated for each interval.
 - b) Draw the acceleration-time graph.
 - c) Determine the average acceleration between 5 s and 20 s.
4. A basketball is thrown straight upwards. The ball slows down as it rises, comes to a stop, and returns to the person's hand with the same speed with which it was thrown upwards. One beneath each other, draw graphs of position-time, velocity-time, and acceleration-time for this motion.



5. For the graph above, if the positive direction is west, determine the following:
 - a) the instantaneous acceleration at 20 s.
 - b) the instantaneous acceleration at 10 s; at 30 s.
 - c) the time interval during which the speed is the largest.
 - d) the time interval(s) during which the displacement is negative.

