

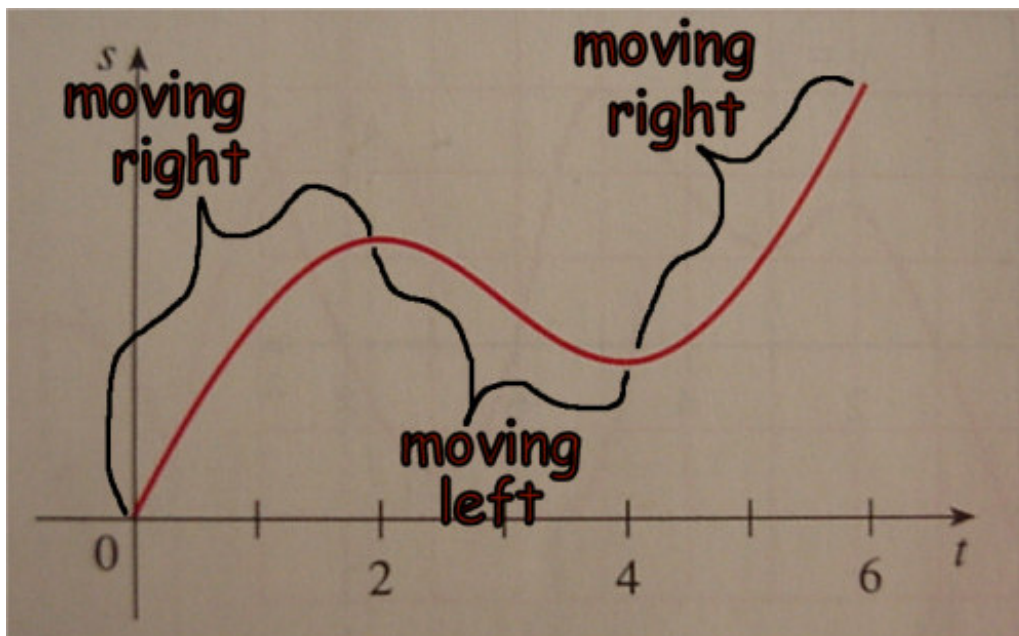
Section 5.1

Solutions and Hints

by Brent M. Dingle

for the book:
Calculus, Early Vectors
by James Stewart.

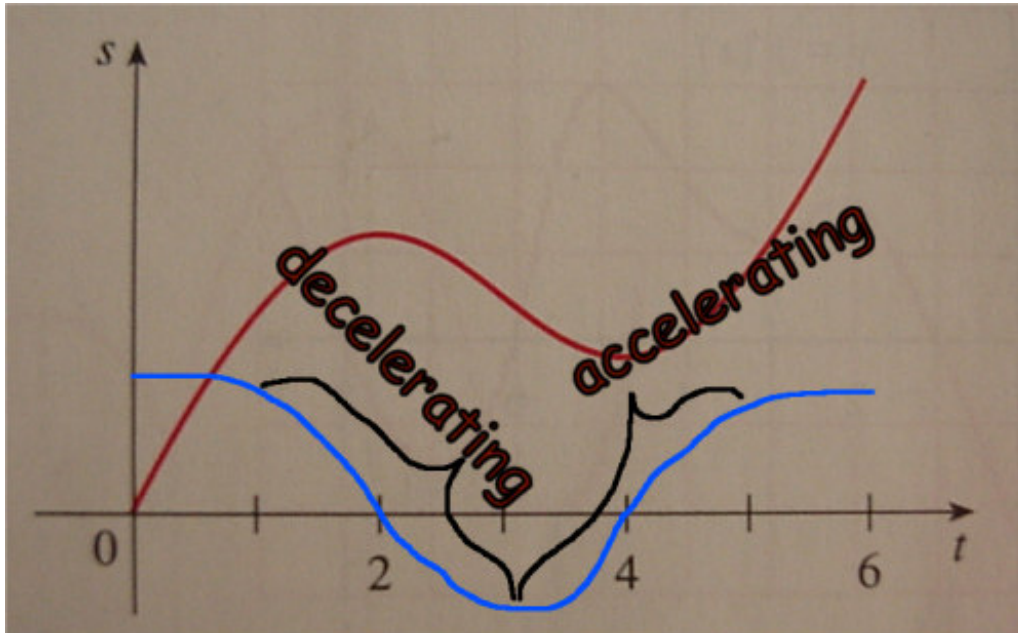
8. A particle is moving along a horizontal straight line. The graph of its position function (the distance to the right of a fixed point as a function of time) is given below.
- 8a. When is the particle moving toward the right and when is it moving toward the left?



The particle is moving right as long as its rate of change (its derivative) is positive. The slope of the curve is positive on $(0, 2)$ and $(4, 6)$. The particle is moving left when its derivative is negative. The slope of the curve is negative, or rather the value of s is decreasing, on $(2, 4)$.

Left on $(2, 4)$ and right on $(0, 2) \cup (4, 6)$.

8b. When does the particle have positive acceleration and when does it have negative acceleration?



The blue line above is a rough sketch of what the derivative of the position function would be, or rather **the blue line is the velocity of the particle.**

Recall that acceleration is the derivative of velocity.

The particle would be decelerating when the slope of the velocity is negative. The velocity appears to be decreasing from about 1 to 3. Likewise the particle is accelerating when the slope of the velocity is positive. So the velocity appears to be increasing from about 3 to 5.

Acceleration is positive on (3, 5).
Acceleration is negative on (1, 3).