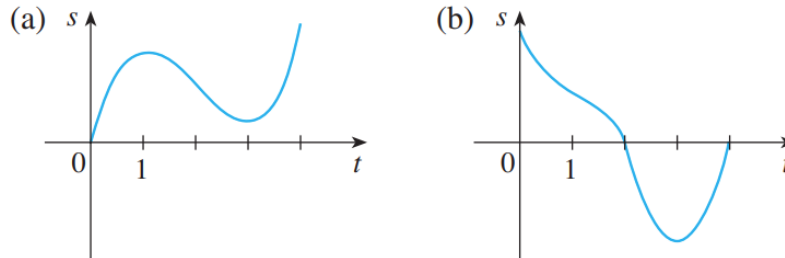


Exercise 6

Graphs of the *position* functions of two particles are shown, where t is measured in seconds. When is each particle speeding up? When is it slowing down? Explain.



Solution

A particle speeds up when both the position's slope is positive and concavity is concave up or when both the position's slope is negative and concavity is concave down. A particle slows down when the position's slope is positive and concavity is concave down or when the position's slope is negative and concavity is concave up.

Part (a)

The particle is speeding up on $1 < t < 2$ and $3 < t < 4$, and the particle is slowing down on $0 < t < 1$ and $2 < t < 3$.

Part (b)

The particle is speeding up on $1 < t < 2$ and $3 < t < 4$, and the particle is slowing down on $0 < t < 1$ and $2 < t < 3$.