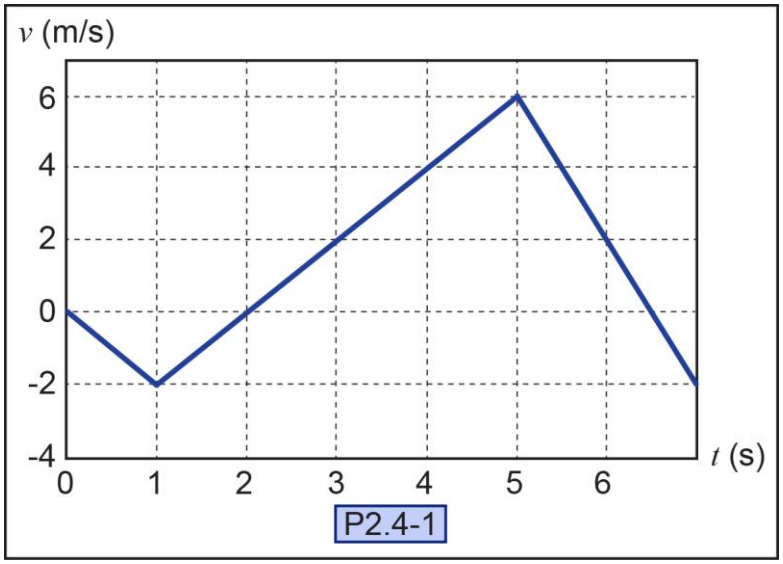
P2.4-1) Consider the given graph that displays a particle's velocity in m/s versus time in seconds. Assuming the particle moves along a straight line, use the given graph to answer the following questions.

a) At what time(s) does the particle change direction?
b) At what time(s) does the particle return to its starting position?

Ans: a) t = 2, 6.5 s, b) t = 3.41 s



Given:

Find:

Solution:

Calculate the time(s) at which the particle change direction.

There are three segments of the speed shown in the above graph. Write down the equation of the line for each segment.

$v(t)_1$ = _____

$v(t)_2$ = _____

$v(t)_3$ = _____

What is the speed of the particle at the point where it changes direction?

v_{turn} = _____

Circle the segment(s) in which the particle change direction?

1 2 3

At what time(s) does the particle change directions.

t_{turn} = _____

Using calculus, calculate the position equations for each segment.

$s(t)_1$ = _____

$s_{t=1}$ = _____

$s(t)_2$ = _____

$s_{t=5}$ = _____

$s(t)_3$ = _____

$s_{t=7}$ = _____

Circle the segment(s) in which the particle returns to its original position?

1 2 3

Use the above information to calculate when the particle returns to its original position.

t = _____

Using the graphical method, calculate the displacement.

Calculate the change in position for the first area of the v-t curve that is below zero.

Δs_1 = _____

For the second area (the area that is above zero), calculate the change in position keeping time as a variable.

Δs_2 = _____

Use the above information to calculate when the particle returns to its original position.

t = _____