P2.1-3) The velocity of a particle moving in a straight line is given by $v = 5 + 7t^{5/2}$ meters per second, where t is in seconds. Determine the position, velocity and acceleration of the particle when t is equal to 5 seconds. The particle is located 10 meters to the right of the origin at t = 0 seconds.

Given:

Find:

Solution:

Derive the particle's position as a function of time.

Circle the equation that you will use?

$\int v(t)\,dt = \int ds$ $\int a(t)\,dt = \int dv$

$\int a(s)\,ds = \int v\,dv$

What are your limits of integration? Remember, it is good practice to leave the upper limit a variable.

$s(t)$ = _____

Calculate the particle's velocity at 5 seconds.

$v_{t=5}$= _____

Calculate the particle's position at 5 seconds.

$s_{t=5}$ = 594 m

Derive the particle's acceleration as a function of time.

Circle the equation that you will use?

$v = \frac{ds}{dt}$ $a = \frac{dv}{dt}$ $a\,ds = v\,dv$

$a(t)$ = _____

Calculate the particle's acceleration at 5 seconds.

$a_{t=5}$ = 195.7 m/s^2

Remember your unit!