P2.2-5) The position of a particle is given by $s = 5t^3 - 60t^2 + 150t - 20$ meters, where t is in seconds. Plot the position (s), velocity (v) and acceleration (a) as functions of time between t = 0 and 6 seconds. Determine at what time the velocity is zero. Also, determine the displacement and the total distance traveled between t = 0 and 6 seconds.

Given:

Find:

Solution:

Plot the particle's position between 0 and 6 seconds.

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

Circle the equation that you will use?

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

$v(t)$ = _____

Plot the particle's velocity between 0 and 6 seconds.

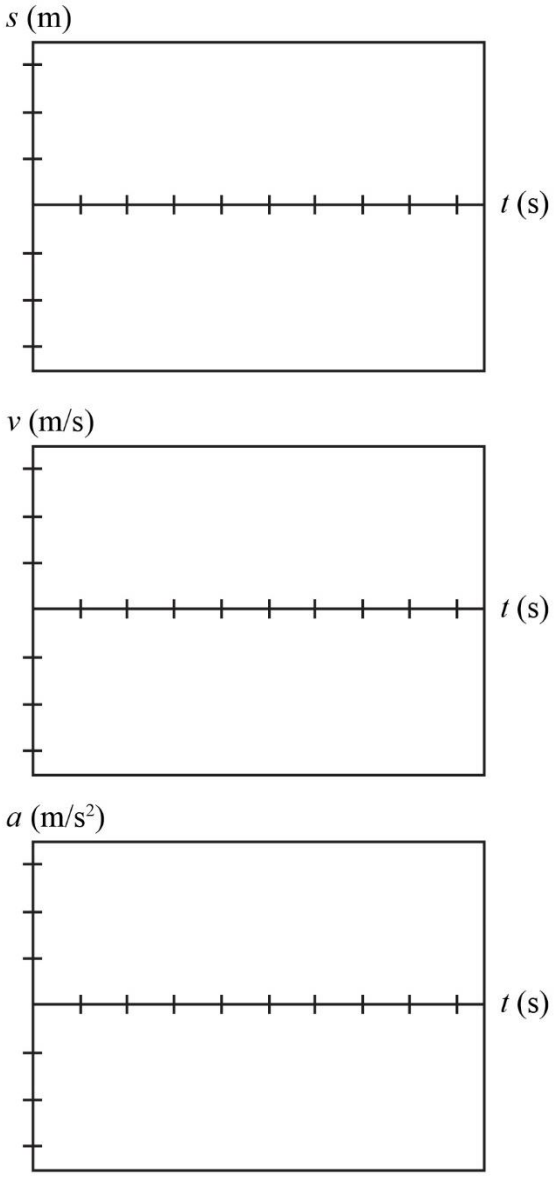
Derive the particle's acceleration as a function of time.

Circle the equation that you will use?

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

$a(t)$ = _____

Plot the particle's acceleration between 0 and 6 seconds.



Determine the time at which the particle's velocity is zero.

t = _____

Calculate the particle's position at key times.

Calculate the particle's position at 0 seconds and then at 6 seconds.

$s_{t=0}$ = _____

$s_{t=6}$ = _____

Does the particle turn within the time span of 0 and 6 seconds?

Yes No

If the particle turned, calculate the particle's position at the turn.

s_{turn} = _____

Calculate the particle's displacement between 0 and 6 seconds.

Δs = _____

Calculate the particle's total distance traveled between 0 and 6 seconds.

s_{total} = 394 m