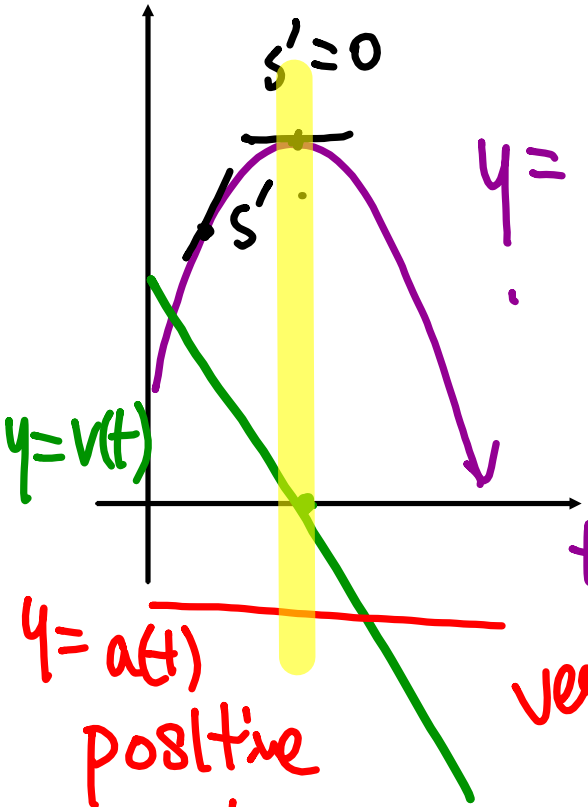
S: position



slope of s(t), s'(t)

$\frac{\Delta s}{\Delta t}$ → velocity, v(t)

"movement → velocity."

vector ← velocity has direction

scalar speed doesn't have direction

up

Rt.

slope of v(t), v'(t)

$\frac{\Delta v}{\Delta t}$ = acceleration, a(t)

accel. → changes velocity

(a) Find the velocity at time t. $v(t) = f' = 3t^2 - 24t + 36$

(b) What is the velocity after 3 s? $v(3) = -9$

(c) When is the particle at rest? $v(t) = 0 = 3t^2 - 24t + 36, t = 2$

(d) When is the particle moving in the positive direction?

(e) Find the total distance traveled during the first 8 s.

(f) Draw a diagram like Figure 2 to illustrate the motion of the particle.

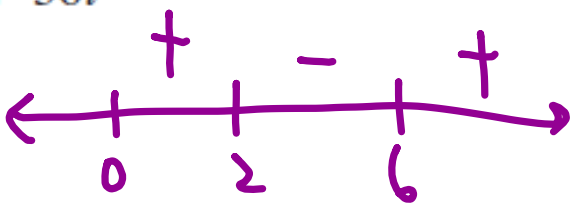
(g) Find the acceleration at time t and after 3 s.

(h) Graph the position, velocity, and acceleration functions for $0 \leqslant t \leqslant 8$.

(i) When is the particle speeding up? When is it slowing down?

1. $f(t) = t^3 - 12t^2 + 36t$

d) $v(t) > 0$



$[0, 2) \cup (6, \infty)$

t	f
0	0
2	32
6	0
8	