7. The position function of a particle is given by $s = t^3 - 4.5t^2 - 7t, t \geq 0$.

(a) When does the particle reach a velocity of 5 m/s?

$v(t) = 3t^2 - 9t - 7 = 5$

$3t^2 - 9t - 12 = 0$

$t^2 - 3t - 4 = 0$

$(t-4)(t+1) = 0$

$t = 4, \cancel{-1}$

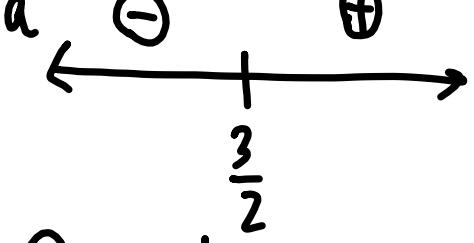
(b) When is the acceleration 0? What is the significance of this value of t?

$v = 3t^2 - 9t - 7$

$a = 6t - 9 = 0$

$t = \frac{3}{2}$

① when $a = 0$,



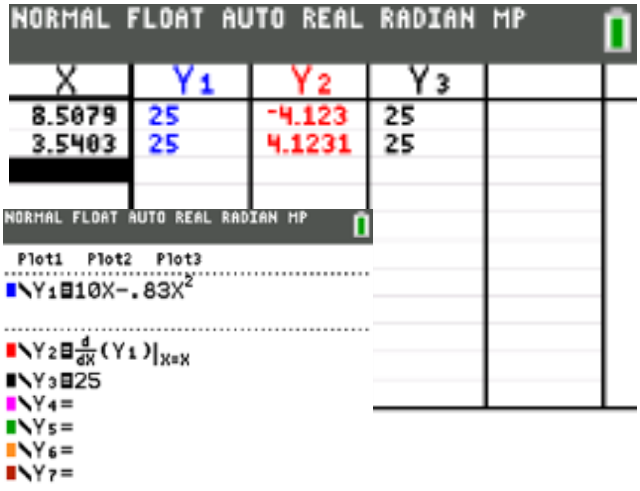
② accel. changed its direction, while $v < 0$

→ point when speed slow down

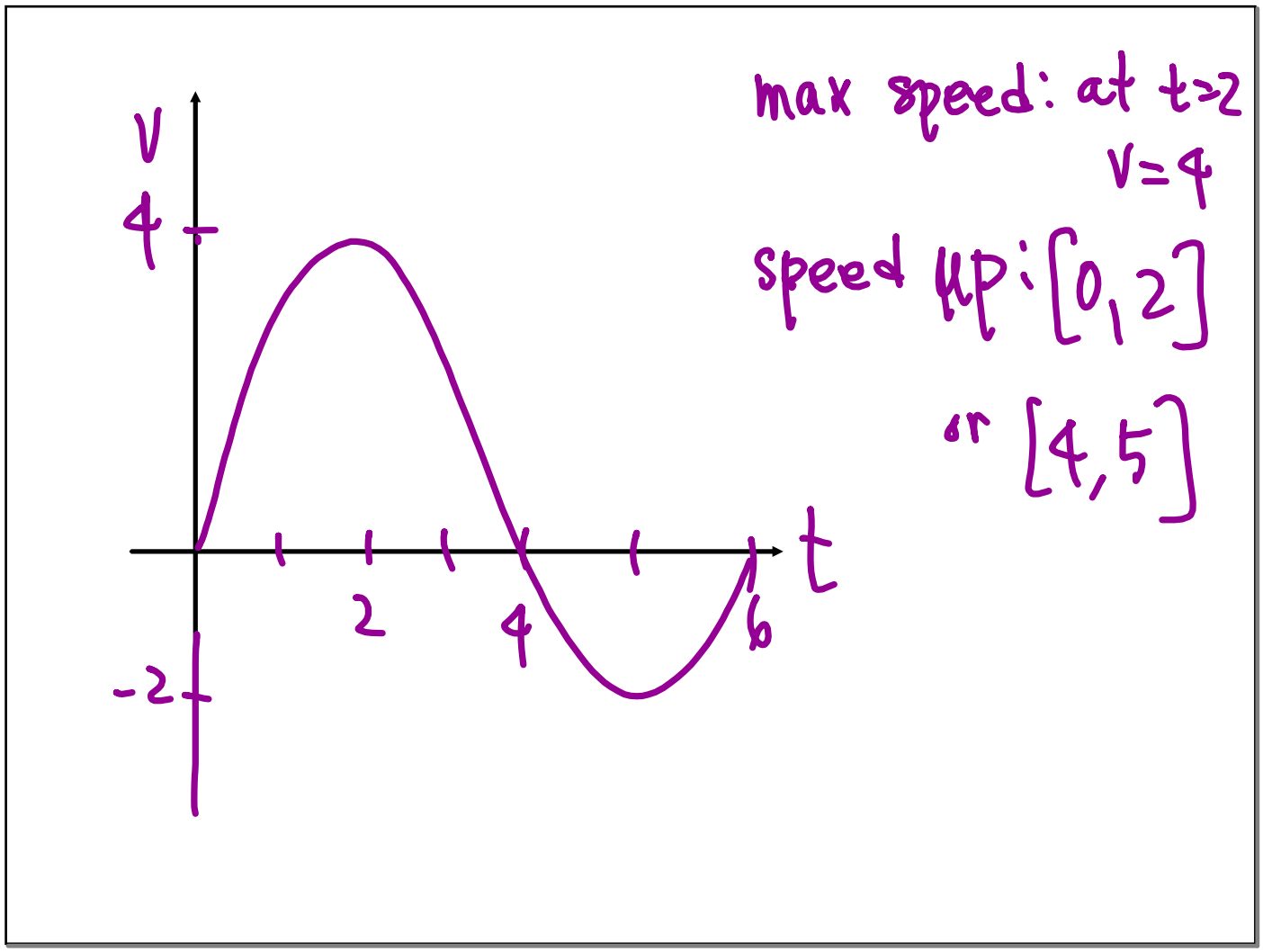
9. If a stone is thrown vertically upward from the surface of the moon with a velocity of 10 m/s, its height (in meters) after t seconds is $h = 10t - 0.83t^2$.
   (a) What is the velocity of the stone after 3 s?
   (b) What is the velocity of the stone after it has risen 25 m?

a) $V = 10 - 1.66t \Big|_{t=3} = 10 - 4.98 = 5.02$ m/s

b) $25 = 10t - .83t^2$, $t = 3.5$ s, 8.5 s



$V = \pm 4.123$ m/s


v
4
-2
2
4
6
t
max speed: at t=2
v=4
speed up: [0,2]
or [4,5]