8.2 example

1. On $t \in [0, 3]$ in seconds, we have two particles described by:

Particle	position (m)	velocity (m/s)	acceleration (m/s^2)
A	$s_A = \dfrac{t(1-t)^2}{t+1} + 2$	$v_A = \dfrac{2t^3 + t^2 - 4t + 1}{(t+1)^2}$	$a_A = \dfrac{2(t^3 + 3t^2 + 3t - 3)}{(t+1)^3}$
B	$s_B = t\ln(t+1)$	$v_B = \dfrac{t}{t+1} + \ln(t+1)$	$a_B = \dfrac{t+2}{(t+1)^2}$

   (a) Calculate $\dfrac{1}{3}\displaystyle\int_0^3 v_A\,dt$ and interpret the result, including units.

   (b) When is particle A slowing down?

   (c) Is the distance between particles A and B increasing or decreasing at:
      (i) $t = 2$?
      (ii) $t = 3$?

   (d) What are the maximum and minimum distances between particles A and B?