2. A particle moves along the x-axis with velocity given by $v(t) = \frac{10 \sin(0.4t^2)}{t^2 - t + 3}$ for time $0 \le t \le 3.5$. The particle is at position x = -5 at time t = 0. (a) Find the acceleration of the particle at time t = 3. v'(3) = -2.1182(b) Find the position of the particle at time t = 3. $-5 + \int_{0}^{3} v(t) dt = -1.7602$ Unauthorized copying or reuse of any part of this page is illegal. -6-Continue question 2 on page 7.

(c) Evaluate
$$\int_{0}^{3.5} v(t) dt$$
, and evaluate $\int_{0}^{3.5} |v(t)| dt$. Interpret the meaning of each integral in the context of the problem.

$$\int_{0}^{3.5} \int_{0}^{1.5} v(t) dt = 2.8439$$
, which is the displacement of the particle from $t=0$ to $t=3.5$

$$\int_{0}^{3.5} |v(t)| dt = 3.7371$$
, which is the total distance the particle from $t=0$ to $t=3.5$
(d) A second particle moves along the x-axis with position given by $x_2(t) = t^2 - t$ for $0 \le t \le 3.5$. At what time t are the two particles moving with the same velocity?
 $v(t) = 2t-1$
 $t \ge 1.5705$