

- 7 A particle P moving in a straight line has displacement x m from a fixed point O on the line at time t s. The acceleration of P , in m s^{-2} , is given by $\frac{200}{x^2} - \frac{100}{x^3}$ for $x > 0$. When $t = 0$, $x = 1$ and P has velocity 10 m s^{-1} directed towards O .

(a) Show that the velocity $v \text{ m s}^{-1}$ of P is given by $v = \frac{10(1-2x)}{x}$. [5]

[illegible]

- (b)** Show that x and t are related by the equation $e^{-40t} = (2x-1)e^{2x-2}$ and deduce what happens to x as t becomes large. [5]

[illegible]