A particle P of mass 0.5 kg moves in a straight line. At time t s the velocity of P is v m s^{-1} and its displacement from a fixed point O on the line is x m. The only forces acting on P are a force of magnitude $\frac{150}{(x+1)^2}$ N in the direction of increasing displacement and a resistive force of magnitude $\frac{450}{(x+1)^3}$ N. When $t = 0$, $x = 0$ and $v = 20$.

Find v in terms of x, giving your answer in the form $v = \frac{Ax+B}{(x+1)}$, where A and B are constants to be determined. [6]