A particle of mass $0.5\,\mathrm{kg}$ moves along a horizontal straight line. Its velocity is $v\,\mathrm{m\,s}^{-1}$ at time $t\,\mathrm{s}$. The forces acting on the particle are a driving force of magnitude $50\,\mathrm{N}$ and a resistance of magnitude $2v^2\,\mathrm{N}$. The initial velocity of the particle is $3\,\mathrm{m\,s}^{-1}$.

(a) Find an expression for v in terms of t. [7]

(b) Deduce the limiting value of v. [1]