A parachutist of mass m kg opens his parachute when he is moving vertically downwards with a speed of $50\,\text{m s}^{-1}$. At time t s after opening his parachute, he has fallen a distance x m from the point where he opened his parachute, and his speed is $v\,\text{m s}^{-1}$. The forces acting on him are his weight and a resistive force of magnitude mv N.

(a) Find an expression for v in terms of t. [6]

(b) Find an expression for x in terms of t. [3]

(c) Find the distance that the parachutist has fallen, since opening his parachute, when his speed is $15\,\text{m s}^{-1}$. [2]