3. **In this question you must show all stages of your working.**

Solutions relying on calculator technology are not acceptable.

A particle P moves along the x-axis.

At time t seconds, $t \geqslant 0$

- the distance of P from the origin O is x metres
- the velocity of P is $v\,\text{m}\,\text{s}^{-1}$

When $t = 0$, P passes through O.

Given that

$$v = 6t^2 + 4t + 1$$

(a) find the acceleration of P in terms of t, where $t \geqslant 0$

(2)

(b) find the distance of P from O when $t = 3$

(3)