8 A car is travelling on a straight horizontal road. The velocity of the car, $v\,\text{m s}^{-1}$, at time t seconds as it travels past three points, P, Q and R, is modelled by the equation

$$v = at^2 + bt + c,$$

where a, b and c are constants.

The car passes P at time $t = 0$ with velocity $8\,\text{m s}^{-1}$.

(a) State the value of c. **[1]**

The car passes Q at time $t = 5$ and at that instant its deceleration is $0.12\,\text{m s}^{-2}$. The car passes R at time $t = 18$ with velocity $2.96\,\text{m s}^{-1}$.

(b) Determine the values of a and b. **[4]**

(c) Find, to the nearest metre, the distance between points P and R. **[2]**