11 A sports car accelerates along a straight road from rest. After 5 s its velocity is $9\,\text{m s}^{-1}$.

In model A, the acceleration is assumed to be constant.

(a) Calculate the distance travelled by the car in the first 5 seconds according to model A. **[2]**

In model B, the velocity v in m s^{-1} is given by $v = 0.05t^3 + kt$, where t is the time in seconds after the start and k is a constant.

(b) Find the value of k which gives the correct value of v when $t = 5$. **[2]**

(c) Using this value of k in model B, calculate the acceleration of the car when $t = 5$. **[2]**

The car travels 16 m in the first 5 seconds.

(d) Show that model B, with the value of k found in part **(b)**, better fits this information than model A does. **[3]**