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A car has an initial velocity of  $1 \text{ m s}^{-1}$

The car is moving in a straight line.

The acceleration  $a \text{ m s}^{-2}$  of the car at time  $t$  seconds is given by

$$a = 3kt^2 - 2kt + 1$$

where  $k$  is a constant.

When  $t = 3$  the car has a velocity of  $10 \text{ m s}^{-1}$

Show that  $k = \frac{1}{3}$

**[4 marks]**