The rate of change of the temperature, $T\,°C$ of a mug of coffee is given by

$$\frac{dT}{dt} = \frac{1}{25}t - k \ , \ 0 \le t \le 50$$

- $t$ is the elapsed time, in minutes, after the coffee is poured into the mug
- $k$ is a constant
- initially, the temperature of the coffee is $100\,°C$
- 10 minutes later the temperature has fallen to $82\,°C$.

Express $T$ in terms of $t$.                                                    **6**

Answer:

$$T = \frac{1}{50}t^2 - 2t + 100$$