Question 3

t (minutes)	0	4	8	12	16
$H(t)$ (°C)	65	68	73	80	90

The temperature, in degrees Celsius (°C), of an oven being heated is modeled by an increasing differentiable function H of time t, where t is measured in minutes. The table above gives the temperature as recorded every 4 minutes over a 16-minute period.

(a) Use the data in the table to estimate the instantaneous rate at which the temperature of the oven is changing at time $t = 10$. Show the computations that lead to your answer. Indicate units of measure.

Question 6

Let $g(x) = xe^{-x} + be^{-x}$, where b is a positive constant.

(a) Find $\lim\limits_{x \to \infty} g(x)$.

(b) For what positive value of b does g have an absolute maximum at $x = \dfrac{2}{3}$? Justify your answer.

(c) Find all values of b, if any, for which the graph of g has a point of inflection on the interval $0 < x < \infty$. Justify your answer.