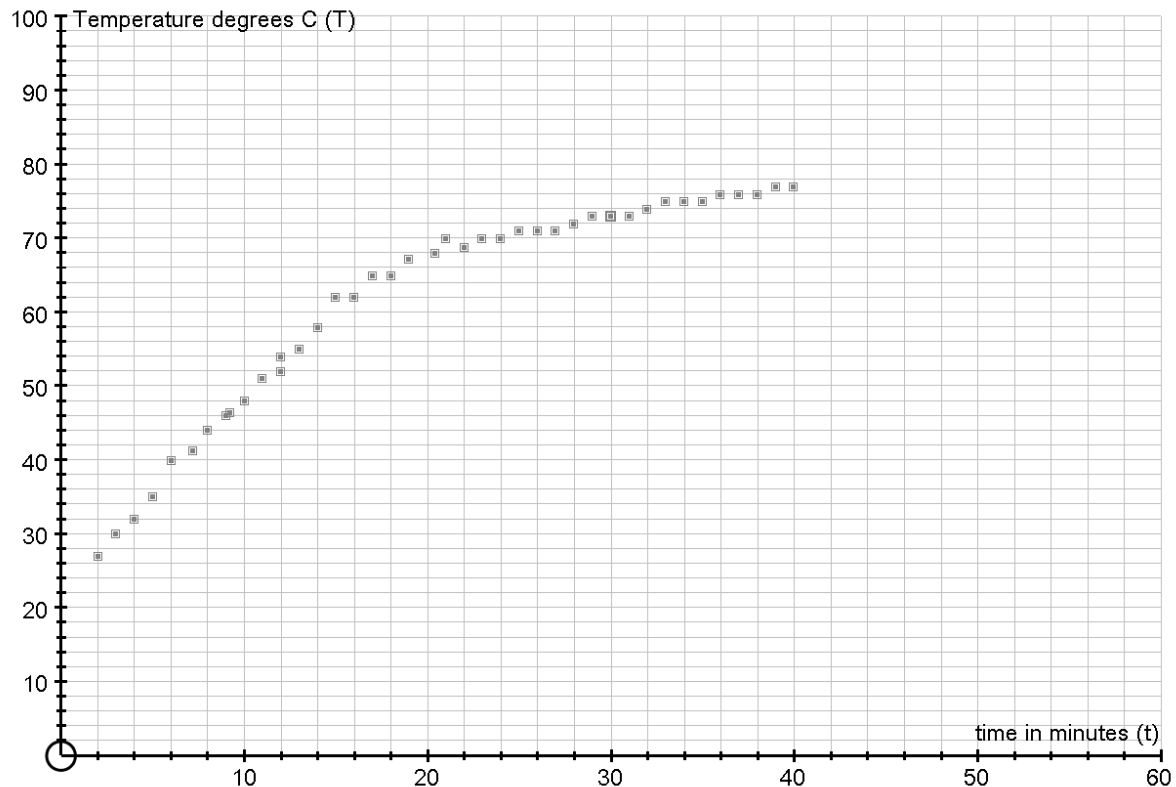


Use of Maths: Car Bonnet

The graph below shows the temperature of a car bonnet which is exposed to strong direct sunshine. Initially the temperature of the bonnet is that of the surroundings, but, due to the input of energy from the sun, the temperature increases.



1. Cameron suggests using the linear approximation $T = 22 + 2.3t$ to model the temperature for $0 \leq t \leq 20$. Draw this line for $0 \leq t \leq 20$ and comment on its suitability. **(4 marks)**
2. For the approximation $T = 22 + 2.3t$ state the physical significance of the vertical axis intercept and state the gradient, giving the correct units. **(3 marks)**
3. Suggest how the approximation may be improved. **(1 mark)**
4. Find a linear approximation for T for the values $20 \leq t \leq 40$. **(3 marks)**
5. For this approximation find how long it would take for the bonnet to reach 120°C (hot enough to fry an egg). **(3 marks)**
6. Explain why, in reality, this temperature may not be reached. **(1 mark)**

(Total 15 marks)