The remainder of this page has been left blank for your workings.
Very short answer questions

1. [2 marks] Each part is worth 1 marks. Please write your answers in the boxes.
   (a) Find the second-degree Maclaurin polynomial for \( f(x) = 2e^{3x} \).

Answer:

(b) Let \( T_4(x) = 14 + 20(x - 2) - 6(x - 2)^2 + 10(x - 2)^3 + 40(x - 2)^4 \) be the fourth-degree Taylor polynomial for a function \( h(x) \) about \( x = 2 \). What is \( h^{(3)}(2) \) (that is, the third derivative of \( h(x) \) at \( x = 2 \))?

Answer:
2. Each part is worth 2 marks.
   (a) Estimate $\sqrt{10}$ using a linear approximation.

   (b) The first Maclaurin polynomial for $f(x) = 2\sin(x)$ is used to estimate $2\sin(0.1)$. Give and justify an upper bound for the absolute error in this approximation.
Long answer question — you must show your work

3. 4 marks A blimp flying in a horizontal line with constant velocity at an altitude of 3 km passes directly above an observer on the ground at 1PM. One hour later, at 2PM, the blimp has traveled 4 km from the point directly above the observer. In kilometers per hour, what is the rate of change of the distance between the blimp and the observer at 2PM?