4 (a) Find the exact value of the root of the equation $e^{3x} = 8$

Give your answer in the form $\ln a$, where a is an integer.

(2)

The curve C_1 has equation $y = 2e^{3x}$ and the curve C_2 has equation $y = (e^{3x} - 4)^2$

The curves C_1 and C_2 intersect at the points P and Q.

(b) Use algebra to find the exact coordinates of the points P and Q.

(5)

(c) Find, to 3 decimal places, the length of PQ.

(2)

Question 4 continued

Question 4 continued

Question 4 continued

(Total for Question 4 is 9 marks)