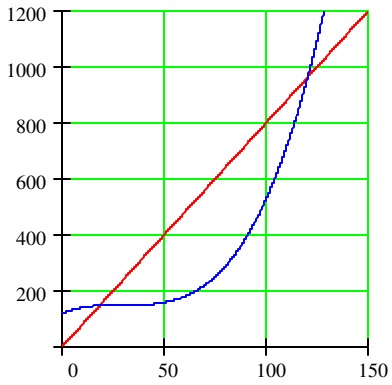
(10.) Cost and revenue functions for a charter bus company are shown in the figure below, where q is the number of buses that the company owns.



(a) (4 pts) Should the company add a 50^{th} bus? How about a 100^{th}? Explain your answers using marginal revenue and marginal cost. (You may illustrate your reasons graphically as well, if you like.)

(b) (3 pts) What does $C'(50) = A$ (A, a constant) mean in the context of this problem? What are the units of the 50 and the units of A?

(c) (4 pts) Estimate the number of buses the company should have in order to maximize profit. Explain how you determined your estimate.

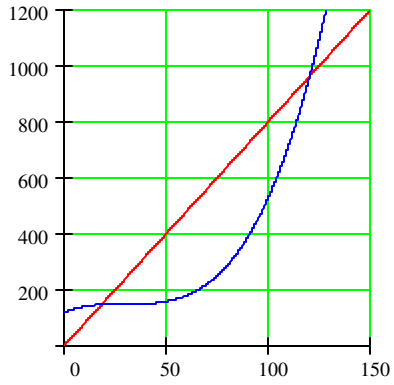
(Problem 10 continued)

(d) (6 pts)

(i) If the average cost, $a(q)$, is given by $a(q) = \dfrac{C(q)}{q}$, approximate q_0 so that $a(q_0)$ is the minimal average cost.

(ii) Show ***analytically*** that average cost will be minimized when $C'(q) = a(q)$.

(iii) Demonstrate on the graph below how this result can be shown graphically.



(11.) And, for good measure, one last derivative…. No need to simplify, but **show all your work.**

(3 pts) Find the derivative of $k(t) = \dfrac{(3t-4)}{\cos(2t)}$.

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