(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.

From the graph, minimum average cost appears to be when $q \approx 60$.

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

Given $a(q) = \frac{C(q)}{q}$, then

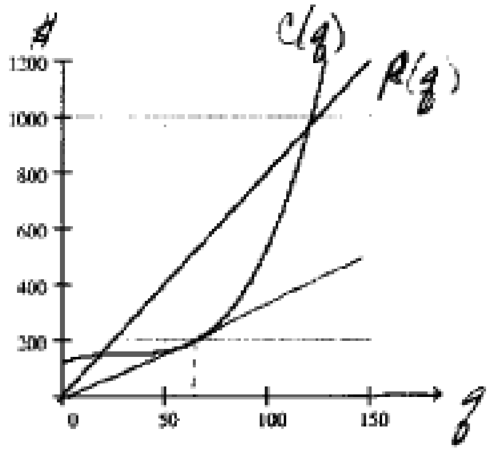
$$a'(q) = \frac{qC'(q) - C(q)(1)}{q^2}$$

& $a'(q) = 0$ if $qC'(q) = C(q)$

$\longrightarrow$ $C'(q) = \frac{C(q)}{q} = a(q)$

Note: $a(q) = \frac{C(q)}{q}$ can be visualized as slope from $(0,0)$ to $(q, C(q))$. These slopes decrease for $0 < q < q_0$ & then increase for $q > q_0$. Thus, there is a min @ $q = q_0$.

(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 $k(t) = \dfrac{(3t-4)}{\cos(2t)}$.

ok to here

$$k'(t) = \frac{\cos(2t)(3) - (3t-4)(-\sin 2t)(2)}{\cos^2(2t)}$$

or

$$= \frac{3\cos(2t) + (6t-8)\sin(2t)}{\cos^2(2t)}$$

If use Quot Rule get

$k'(t) = (3t-4)[-(\cos(2t))^{-2}(-2\sin(2t))] + 3(\cos(2t))^{-1}$

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