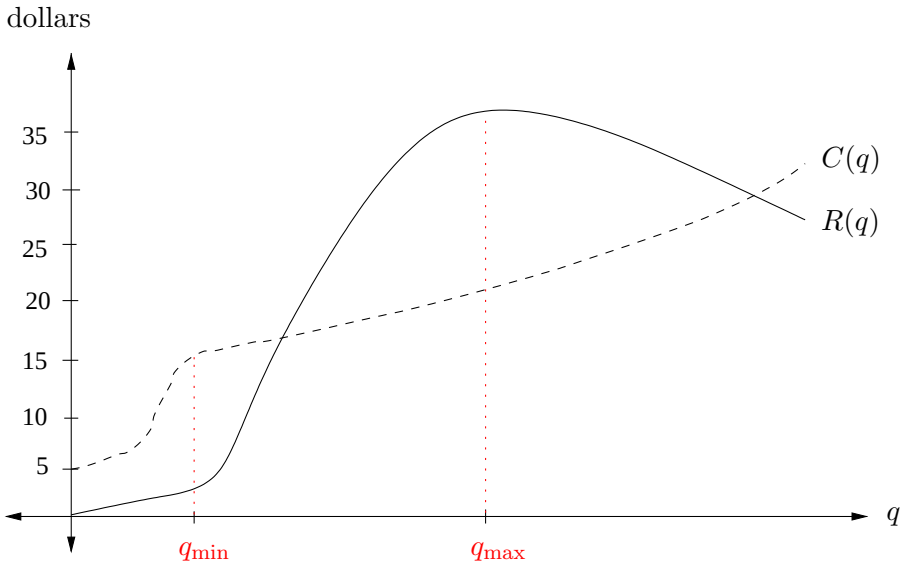
3. (8 points) While home for summer break you find yourself unable to find a steady summer job. You decide to open up a lemonade stand for a day and try to use what you've learned in calculus to your benefit. Below are the graphs of your cost, C, and revenue, R (both measured in dollars), as functions of the number of liters of lemonade you sell, q.



(a) What is the fixed cost of running your lemonade stand?

The fixed costs of running the lemonade stand can be read as the value $C(0)$, which is the cost when selling no lemonade. This is easily seen to be \$5.

(b) Indicate the point on the $q-$axis above that maximizes your profit. Label that point $q_{\max}$. Explain how you arrived at your choice of $q_{\max}$.

In order to find the point that maximizes profit, one can either look for the $q-$value that gives the largest value of $R(q) - C(q)$ or one can look for the $q-$value for which $R'(q) = C'(q)$ and $R(q) > C(q)$.

(c) You decide to run your lemonade stand for another day and put your economically challenged cousin in charge of it for you. Unfortunately, he gets confused and sells the amount of lemonade that will maximize your *losses*. Assuming the graph above is valid for the second day as well, indicate on the $q-$axis the amount of lemonade your cousin sold. Label this point as $q_{\min}$. Explain how you arrived at your choice of $q_{\min}$.

In this case, one just reverses the roles of C and R in part (b). So one looks to find q for which $C(q) - R(q)$ is largest or the $q-$value where $R'(q) = C'(q)$ but $C(q) > R(q)$.