Online: Break-even point

Full Marks: 10

It costs a firm $C(q)$ dollars to produce q grams per day of a certain chemical, where

$$C(q) = 1000 + 2q + 3q^{\frac{2}{3}}$$

The firm can sell any amount of the chemical at 300 BDT a gram. Find the break-even point of the firm, that is, how much it should produce per day to have neither a profit nor a loss (i.e., cost equals revenue at the break-even point). Say, the break-even point quantity is x. Use the Newton Raphson method to compute x with an error precision of at most $\epsilon_s = 0.05\%$. Show the estimate of the root and absolute relative approximate error after every iteration. Show the graph of $f(x)$ and explain how you chose the initial guess.