1. **Round all answers to three decimal places.**
   If $x$ thousand dollars are spent on labor and $y$ thousand dollars are spent on equipment, then the output of a certain factory is given by
   \[ Q(x, y) = 100x^{1/4}y^{3/4} \]
   units. Suppose that the total budget is $200,000.

   (a) How should the budget be allocated between labor and equipment to generate the maximum possible output? What is the maximum possible output?

   **11 pts**

   (b) Suppose budget cuts are made and the total budget is lowered to $190,000. Without resolving the problem, estimate the change in the maximum output.

   **4 pts**