1. Consider a circle with circumference 1. 200 consumers are uniformly distributed around the circle, and each buys 1 unit of the good from the firm with the lowest price plus delivery cost. Consumers derive utility $V = 20$ from consuming the good. There are 8 firms located an equal distance from each other. Firms have fixed costs $F = 4$ and marginal costs $mc = 1$. The delivery cost is 2 per unit distance.

   (a) Derive the symmetric equilibrium (price and profit).

   (b) Suppose that there is now free entry. Derive the free-entry equilibrium (price and the number of firms).