

Practice Problem

(The attached PDF file has better formatting.)

Municipal Fair and Consumer Welfare

A municipality with 100,000 taxpayers organizes a fair, for which it charges no admissions fee. The fixed costs of the fair are \$100,000, and the marginal costs are \$2 for each visitor. The benefit received by each visitor is $10 - V / 10,000$, where V is the number of visitors. The opportunity cost of the time spent by each visitor to the fair is \$3. The visitors all have the same tastes.

- A. What is the number of visitors at the fair?
- B. What is the cost per taxpayer of the fair?
- C. What is the social gain or loss from the fair?
- D. To maximize social welfare, what admission fee should be charged for the fair?

Part A: The cost to each visitor is the opportunity cost of \$3 plus the admission fee of zero. The benefit is $10 - V / 10,000$. Equating marginal cost to benefit gives

$$10 - V / 10,000 = 3 \Rightarrow V = 10,000 \times 7 = 70,000 \text{ visitors.}$$

Part B: With 70,000 visitors, the marginal cost is $70,000 \times \$2 = \$140,000$. The fixed cost is \$100,000, so the total cost is \$240,000. The cost per taxpayer with 100,000 taxpayers is \$2.40.

Part C: The gain from the fair is zero for each visitor, since the benefit from the fair equals the opportunity cost. The marginal cost is \$2.40 per taxpayer. The net social gain or loss is a \$240,000 loss.

Part D: The total benefit to the municipality from the fair is the benefit from the fair minus the opportunity cost of the visitors' time = $V \times (10 - V/10,000 - 3) = 7V - V^2/10,000$. The marginal benefit is the derivative of the total benefit with respect to the number of visitors:

$$\partial(7V - V^2/10,000)/\partial V = 7 - V/5,000.$$

Equating marginal benefit and marginal cost gives

$$7 - V/5,000 = 2 \Rightarrow V = 5,000 \times (7 - 2) = 25,000.$$

With 25,000 visitors, the benefit to each visitor is $10 - 25,000 / 10,000 = \$7.50$. The opportunity cost is \$3, so the admissions fee is \$4.50, making the marginal cost equal to the marginal benefit.

The gain to each visitor is \$4.50, so the total social benefit is $4.50 \times 25,000 = \$112,500$. The cost is $100,000 + 25,000 \times \$2 = \$150,000$. The net social loss is $150,000 - 112,500 = \$37,500$.

{Note: This practice problem should help you with the homework assignment.}