Altaf Raffik

TCET4140

HW # 2

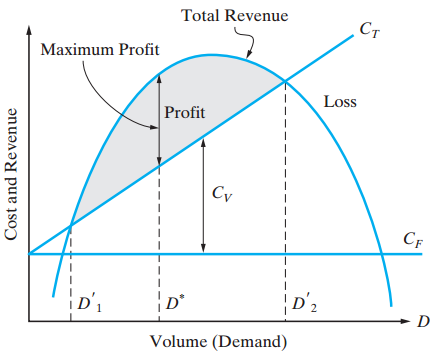
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Chapter 2 – Engineering Economics

2.11-2.17

2.11) A large, profitable commercial airline company flies 737-type aircraft, each with a maximum seating capacity of 132 passengers. Company literature states that the economic breakeven point with these aircraft is 62 passengers. (2.2)

a. Draw a conceptual graph to show total revenue and total costs that this company is experiencing.



b. Identify three types of fixed costs that the airline should carefully examine to lower its breakeven point. Explain your reasoning.

Three types of fixed costs include aircraft financing, insurance, books, charts and materials, hangar rental, taxes and FAA registration fees, aircraft accessories, and crew member annual salaries.

c. Identify three types of variable costs that can possibly be reduced to lower the breakeven point. Why did you select these cost items?

Three types of variable costs include fuel, oil, landing fees, catering, crew expenses, crew salaries (if paid per flight hour), and maintenance.

2.12) A company produces circuit boards used to update outdated computer equipment. The fixed cost is $42,000 per month, and the variable cost is $53 per circuit board. The selling price per unit is p=$150−0.02D. Maximum output of the plant is 4,000 units per month. (2.2)

a. Determine optimum demand for this product.

b. What is the maximum profit per month?

c. At what volumes does breakeven occur?

d. What is the company’s range of profitable demand?

480–4,000 units per month

2.13) A local defense contractor is considering the production of fireworks as a way to reduce dependence on the military. The variable cost per unit is $40. The fixed cost that can be allocated to the production of fireworks is negligible. The price charged per unit will be determined by the equation p=$180−(5)D, where D represents demand in units sold per week.(2.2)

1. What is the optimum number of units the defense contractor should produce in order to maximize profit per week?
2. What is the profit if the optimum number of units are produced?

2-14.A large wood products company is negotiating a contract to sell plywood overseas. The fixed cost that can be allocated to the production of plywood is $900,000 per month. The variable cost per thousand board feet is $131.50. The price charged will be determined by p=$600−(0.05)D per 1,000 board feet.(2.2)

1. For this situation determine the optimal monthly sales volume for this product and calculate the profit (or loss) at the optimal volume.

b. What is domain of profitable demand during a month?

2-15.A company produces and sells a consumer product and is able to control the demand for the product by varying the selling price. The approximate relationship between price and demand is

, for D>1, where p is the price per unit in dollars and D is the demand per month. The company is seeking to maximize its profit. The fixed cost is $1,000 per month and the variable cost (cv) is $40 per unit. (2.2)

a. What is the number of units that should be produced and sold each month to maximize profit?

b. Show that your answer to Part (a) maximizes profit.

The sign of the second derivative is negative.

2-16.An electric power plant uses solid waste for fuel in the production of electricity. The cost Yin dollars per hour to produce electricity is Y=12+0.3X+0.27X2, where X is in megawatts. Revenue in dollars per hour from the sale of electricity is 15X−0.2X2. Find the value of X that gives maximum profit. (2.2)

2-17.The annual fixed costs for a plant are $100,000, and the variable costs are $140,000 at 70% utilization of available capacity, with net sales of $280,000. What is the breakeven point in units of production if the selling price per unit is $40? (2.2)