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September 30, 2013

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TCET4140

**Homework #2 Ch2**

2.11

* A large, profitable commercial airline company flies 737-type aircraft, with each indicating a seating capacity of 132 passengers. Company literature indicates that the economic breakeven point with these aircraft should be 62 passengers.
1. **Conceptual graph showing total revenue versus total costs of this company**



D’1 is the breakeven pint

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

- The fixed cost is an interest cost on borrowed capital; it could be lowered down by paying off borrowed capital. Another fixed costs are insurances and they could be lowered down by obtaining quotes from other insurances. The last fixed costs represented is a corporate and administrative overhead. Lowering an overhead should help the airline to breakeven with fewer passengers.

1. **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 are Fuel, labor, and flight crew. They could be varied to lower breakeven.

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* A company produces circuit boards used to update outdated computer equipment.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.

1. **Optimum demand for this product**

$$D^{\*}=\frac{a-cv}{2b} = \frac{\$150-\$53}{2(0.02)}=2425 units/ month$$

1. **Maximum profit per month**

[$150 *(*2,425*)* − 0.02 *(*2,425*) ^*2] − [$42,000 + $53 *(*2,425*)*] = $75,612.50

1. **Breakeven occurring Volume**

−*bD*2 + *(a* − *CV) D* − *CF* = 0

−0.02*D^*2 + *(*$150 − $53*) D* − $42,000 = 0

−0.02*D^*2 + 97*D* − 42,000 = 0

1. **Company’s range of profitable demand**

$$D^{' }=\frac{-97 \pm [(97)\^2 - 4(-0.02)(-42,000)]\^0.5}{2(-0.02)}$$

$$D^{'1}=\frac{-97 + 77.8}{-0.04}=480.62 units/ month.$$

$$D^{'2}=\frac{-97- 77.8}{-0.04}=4,370.00 units/ month.$$

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

$$D^{\*}=\frac{a-cv}{2b}=\frac{\$180-\$40}{2(5)}=14 units per week$$

1. **What is the profit if the optimum numbers of units are produced?**

[$180(14) − 5(14) ^2] − [$40(14)] = $980.00

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.

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

$$D^{\*}=\frac{a-cv}{2b}=\frac{\$600-\$131.50}{2(0.05)}=12 units per month$$

[$600*(*12*)* − 0.05*(*12*)^*2] − [$900,000+ $131.50*(*12*)*] = -$894,385.20

1. **What is domain of profitable demand during a month?**

$$D^{' }=\frac{-468.50 \pm [(468.50)\^2 - 4(-0.05)(-900,000)]\^0.5}{2(-0.05)}$$

$$D^{'1}=\frac{-468.50 + 198.73}{-0.04}=6,744.25 units per month.$$

$$D^{'2}=\frac{-97- 198.73}{-0.04}=7,393.25 units per month.$$

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 p = $38 + 2,700/D − 5,000/D2, 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.

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

I do not understand how to complete this problem.

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

2.16

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

I do not understand how to complete this problem.

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?**

Total Cost= $240,000

Total revenue= $280,000

Breakeven = 6,000 Units