§1.3 - Application of Inequalities

Example 1:

A company that manufactures pipes, the variable cost is 21 per pipe and the fixed cost is 70,000. If the selling price of a pipe is 35. How many must be sold for the company to earn profit?

Solution:

Required: profit > 0

Total revenue $-$ Total cost > 0

(Selling price per unit)($\#$ of units) $- \left[\text{fixed cost} + \text{variable cost} \right] > 0$

$$35 \cdot n - \left[70000 + 21 \cdot n \right] > 0$$

$$35n - 70000 - 21 \cdot n > 0$$

$$14 n > 70000 \rightsquigarrow n > \frac{70000}{14} = 5000.$$

Exercise 1:

To produce 1 unit of a new product, a company determines that the cost for material is $2.5 and the cost of labor is $4. The fixed cost is $5000. If the cost of a wholesaler is 7.4 per unit, determine the least number of units that must be sold by the company to realize a profit.

Example 2: (Rent or Purchase)

To rent a car, the rental fees would be 300 BD monthly and total daily cost (gas, insurance) driver is 1.8 BD for each day.

To buy a car, the monthly payment is 166.6 BD and it cost daily 2.3 BD (for maintenance). What is the least number of days each year that one would have to use the car to justify renting it retter than buying it?

Solution:

$$Cost_{rent} > Cost_{Buy}$$

$$300(12) + 1.8n > 166.6(12) + 2.3n$$

$$1600 > 0.5n \rightsquigarrow 320 > n, \text{ so it must be used}$$

for more than 320 days to justify renting it.

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Example 3: Current Ratio

(cash, merchandise,...)

$$Current\ Ratio = \frac{Current\ assets}{Current\ liabilities} \leftarrow (loan, ...)$$

A company has current asset of 350,000 BD and current liabilities of 80,000 BD. How much they can borrow if the current ratio is no less than 2.5?

Solution :-

$$\text{Current ratio} \geqslant 2 \cdot 5$$

$$\frac{\text{current assets}}{\text{current liabilities}} \geqslant 2 \cdot 5$$

$$\frac{350000 + X}{80000 + X} \geqslant \frac{2 \cdot 5}{1}$$

$$35000 + X \geqslant 2 \cdot 5 \left(80000 + X \right)$$

$$35000 + X \geqslant 200{,}000 + 2 \cdot 5 X$$

$$150{,}000 \geqslant 1 \cdot 5 X$$

$$\boxed{100{,}000 \geqslant X}$$