

1 Review

- Consumer Theory
 - Substitution and Income effect
 - Perfect Substitutes
 - Perfect Complements
- Producer Theory
 - Production function
 - Capital\Labor
 - Diminishing Marginal Productivity
- Costs
 - Total Cost
 - Fixed Cost
 - Variable Cost
 - Average costs
 - Marginal cost

2 Problems: Consumer Theory and Producer Theory

1. Consider the economy in Mars. There are two goods in Mars, right shoe and left shoe. The price of right shoe is 10 mars dollars and the price of left shoe is 5 mars dollars. Martian, a mars alien, earns 30 mars dollars per day.
 - (a) Find Martian's (weekly) budget constraint (equation that characterize his choice set) and then draw his budget line. As a normal mars alien, Martian has one right leg and two left legs so he gains utility from the number of combinations of one right shoe and two left shoes.
 - (b) Draw two indifferent curves each represents different levels of utility.
 - (c) Find Martian's optimal consumption bundle. A huge meteorite hits a right shoe plant in mars and the price of right shoe suddenly increases to 20 mars dollars.
 - (d) Draw a new budget line and find Martian's optimal consumption bundle under this new budget line.
 - (e) Illustrate income and positive effect in your graph.
 - (f) Is cross-price elasticity of left shoe demand with respect to right shoe price positive? Are these two goods complements or substitutes?

Table 1: Information

Quantity	Wage(Total Variable Cost)
1	95
2	180
3	270
4	370
5	490
6	620

2. Charlie is an owner of the chocolate factory. His factory uses two inputs, a single machine and labor. The rental cost of the machine is \$100 per month and is not refundable. The labor cost per month associated with each level of output is given in the following table
- Calculate the total cost, the average variable cost, the average total cost and the marginal cost for each quantity of output.
 - What is the shutdown price?
 - At the beginning of November, Charlie rent a machine without knowing market price. After he pays rental cost of machine, he realizes the market price of chocolate is \$100. How many units does he produce? What is his revenue?
 - On December, he observes the market price of chocolate is \$100 before he pays the rental costs. How many unit does he produce? What is his revenue?
3. A gummy bear plant has a total production cost function given by the following equation:

$$TC = Q^2 + 2Q + 100$$

- What is the total cost of gummy bear when the plant produces 10 units? What is the total variable cost?
- What is the average total cost of gummy bear when the plant produces 10 units? What is the average variable cost?
- Derive average variable cost function and average total cost function. Draw these two functions.
- Marginal cost function is given by the following equation: $MC = 2Q + 2$ Draw marginal cost function and find the point where average total cost and marginal cost cross.
- Derive short run and long run supply curves.
- Find the shutdown point and breakeven point in your graph. Explain what would happen if the price is below the breakeven price.