1. Define, *in your own words*, the following concepts

   a. An economic model
   b. Marginal analysis
   c. Normative and Positive economics
   d. Factors of Production
   e. Opportunity cost
   e. Comparative advantage

**See the textbook**

2. Problem 4, chapter 1, page 21 K&W

   a. The worst the job market, the lower the opportunity cost of getting a graduate degree. One of the opportunity costs of going to graduate school is not being able to work. But if the job market is bad, the salary you can expect to earn is low or you might be unemployed—so the opportunity cost of going to school is also low.

   b. When the economy is slow, the opportunity cost of people’s time is also lower: the wages they could earn by working longer hours are lower than when the economy is booming. As a result, the opportunity cost of spending time doing your own repairs is lower—so more people will decide to do their own repairs.

   c. The opportunity cost of parkland is lower in suburban areas. The price per square foot of land is much higher in urban than in suburban areas. By creating parkland, you therefore give up the opportunity to make much more money in cities than in the suburbs.

   d. The opportunity cost of time is higher for busy people. Driving long distances to supermarkets takes time that could be spent doing other things. Therefore, busy people are more likely to use a nearby convenience store.

   e. Before 10:00 A.M. the opportunity cost of time for many students is very high—it means giving up an extra hour’s sleep. That extra hour is much more valuable before 10:00 A.M. than later in the day.

3. Problem 2, chapter 2, page 42 K&W

   a. The accompanying diagram shows the production possibility frontier for Atlantis.
b. No, Atlantis cannot produce 500 pounds of fish and 800 pounds of potatoes. If it produces 500 pounds of fish, the most potatoes it can produce is 600 pounds. This point would lie outside the production possibility frontier, at point G on the diagram.

c. The opportunity cost of increasing output from 600 to 800 pounds of potatoes is 200 pounds of fish. If Atlantis increases output from 600 to 800 pounds of potatoes, it has to cut fish production from 500 pounds to 300 pounds, that is, by 200 pounds.

4. Problem 4, chapter 2, page 43 K&W

a. The accompanying diagram shows the production possibility frontier for the Tivoli in panel (a) and for the Frivoli as the line labeled “Original Frivoli PPF” in panel (b).

The production possibility frontier for the Tivoli was calculated as follows: the Tivoli can produce either 30 pounds of spaghetti and no meatballs, or they can produce no spaghetti but 50 pounds of meatballs. That is, the opportunity cost of 1 pound of meatballs is 3/5 of a pound of spaghetti: in order to produce 1 more pound of meatballs, the Tivoli have to give up 3/5 of a pound of spaghetti. This means that the
slope of their production possibility frontier is $-\frac{3}{5}$. A similar argument for the Frivoli shows that their production possibility frontier has a slope of $-\frac{4}{3}$.

b. For the Tivoli, the opportunity cost of 1 pound of meatballs is $\frac{3}{5}$ of a pound of spaghetti. For the Frivoli, the opportunity cost of 1 pound of meatballs is $\frac{4}{3}$ pounds of spaghetti. That is, the Tivoli have a comparative advantage in meatball production because their opportunity cost is lower. For the Tivoli, the opportunity cost of 1 pound of spaghetti is $\frac{5}{3}$ pounds of meatballs. For the Frivoli, the opportunity cost of 1 pound of spaghetti is $\frac{3}{4}$ pound of meatballs. That is, the Frivoli have a comparative advantage in spaghetti production because their opportunity cost is lower.

c. The Frivoli’s new production possibility frontier is the line labeled “New Frivoli PPF” in panel (b) of the diagram. Instead of producing 30 pounds of meatballs (if they produce no spaghetti), they can now produce 60 pounds.

d. Now the Frivoli have the absolute advantage in both meatball production and spaghetti production. The Frivoli’s opportunity cost of meatballs has now fallen to $\frac{4}{6} = \frac{2}{3}$; that is, for each pound of meatballs that the Frivoli now produce, they have to give up producing $\frac{2}{3}$ of a pound of spaghetti. Since the Frivoli’s opportunity cost of meatballs ($\frac{2}{3}$) is still higher than the Tivoli’s ($\frac{3}{5}$), the Tivoli still have the comparative advantage in meatball production. The Frivoli’s opportunity cost of spaghetti is $\frac{3}{2}$ pounds of meatballs and the Tivoli’s is $\frac{5}{3}$ pounds of meatballs, so the Frivoli have the comparative advantage in spaghetti production.

5. In the United States, the opportunity cost of 1 ton of corn is 50 bicycles. In China, the opportunity cost of 1 bicycle is 0.01 ton of corn.

a. Determine the pattern of comparative advantage.

A. Pattern of comparative advantage
US’ opportunity cost:
1 ton of corn = 50 bicycles.
1 bicycle = 0.02 ton of corn

China’ opportunity cost:
1 ton of corn = 100 bicycles
1 bicycle = 0.01 ton of corn

In US the opportunity cost of corn in terms of bicycles is lower than China’s. Hence, US has a comparative advantage in corn. China’s opportunity cost of producing bicycles in terms of corn is lower than US. Therefore, China has a comparative advantage in bicycles.

b. In autarky (no trade), the United States can produce 200,000 bicycles if no corn is produced, and China can produce 3,000 tons of corn if no bicycles are produced. Draw
each country’s production possibilities frontier assuming constant opportunity cost, with tons of corn on the vertical axis and bicycles on the horizontal axis.

Production Possibilities Frontier

US: 200,000 bicycles, 0 corn. 0 bicycles, 4,000 corn.
China: 0 bicycles, 3,000 corn. 300,000 bicycles, 0 corn.

![United States Production Possibilities Frontier](image)
![China Production Possibilities Frontier](image)

c. With trade, each country specializes its production. The United States consumes 1,000 tons of corn and 200,000 bicycles; China consumes 3,000 tons of corn and 100,000 bicycles. Indicate the production and consumption points in your diagrams, and use them to explain the gains from trade.

US specialize in producing only corn, and China specializes in producing only bicycles.
US produce 4000 tons of corn and China produces 300,000 bicycles.

Points: US (0, 4,000); China (200,000, 0)

With trade, the United States will be able to US consumes 1,000 tons of corn and 200,000 bicycles (3,000 tons of corn left for trade)
China: consumes 3,000 tons of corn and 100,000 bicycles (200,000 bicycles left for trade)

6. Problem 1, chapter 3, page 90 K&W

a. By reducing their herds, herds, dairy farmers reduce the supply of cream, a leftward shift of the supply curve for cream. As a result, the market price of cream rises, raising the cost of producing a unit of chocolate ice cream. This results in a leftward shift of the supply curve for chocolate ice cream as ice-cream producers reduce the quantity of chocolate ice cream supplied at any given price. Ultimately, this leads to a rise in the equilibrium price and a fall in the equilibrium quantity.

b. Consumers will now demand more chocolate ice cream at any given price, represented by a rightward shift of the demand curve. As a result, both equilibrium price and quantity rise.
c. The price of a substitute (vanilla ice cream) has fallen, leading consumers to substitute it for chocolate ice cream. The demand for chocolate ice cream decreases, represented by a leftward shift of the demand curve. Both equilibrium price and quantity fall.

d. Because the cost of producing ice cream falls, manufacturers are willing to supply more units of chocolate ice cream at any given price. This is represented by a rightward shift of the supply curve and results in a fall in the equilibrium price and a rise in the equilibrium quantity.

7. Problem 2, chapter 3, page 90 K&W

a. A rise in the price of a substitute (tacos) causes the demand for hamburgers to increase. This represents a rightward shift of the demand curve from D1 to D2 and results in a rise in the equilibrium price and quantity as the equilibrium changes from E1 to E2.

b. A rise in the price of a complement (french fries) causes the demand for hamburgers to decrease. This represents a leftward shift of the demand curve from D1 to D2 and results in a fall in the equilibrium price and quantity as the equilibrium changes from E1 to E2.

c. A fall in income causes the demand for a normal good (hamburgers) to decrease. This represents a leftward shift of the demand curve from D1 to D2 and results in a fall in the equilibrium price and quantity as the equilibrium changes from E1 to E2.
d. A fall in income causes the demand for an inferior good (hamburgers) to increase. This represents a rightward shift of the demand curve from D1 to D2 and results in a rise in the equilibrium price and quantity as the equilibrium changes from E1 to E2.

8. Problem 10, chapter 3, page 91 K&W

a. Fewer fans want to attend the next game after the announcement is made. As a result, the demand curve will shift leftward from D1 to D2, as fewer tickets are demanded at any given price; other things equal, this results in a fall in both equilibrium price and quantity. In addition, the supply curve will shift rightward from S1 to S2, as more season ticket-holders are willing to sell tickets at any given price.
Other things equal, this results in a fall in equilibrium price and a rise in equilibrium quantity. In this case, the leftward shift of the demand curve exceeds the rightward shift of the supply curve; as a result, equilibrium quantity falls, shown by the change of the equilibrium from E1 to E2.

![Diagram showing demand and supply curves with shifts from E1 to E2]

b. The supply and demand curves shift in the same manner as in part a, but in this case the rightward shift of the supply curve exceeds the leftward shift of the demand curve. Consequently, equilibrium quantity rises, shown by the change of the equilibrium from E1 to E2.

![Diagram showing demand and supply curves with shifts from E1 to E2]

c. Case a (equilibrium quantity falls) occurs because the decrease in demand exceeds the increase in supply. Case b (equilibrium quantity rises) occurs because the increase in supply exceeds the decrease in demand.

d. A scalper who learns about the announcement secretly should take actions—such as lowering price somewhat—that ensure that he will sell all of his tickets before the announcement is made. He will do this because he knows a ticket will command a much lower price after the announcement. An expectation that the price will be lower in the future causes supply to increase today.

9. Problem 12, chapter 3, page 91 K&W

a. The supply curve is S1 and the demand curve is D1. The equilibrium in the market for pickup trucks is indicated by point E1, with an equilibrium price of $30,000 and an equilibrium quantity of 16 million trucks bought and sold.
b. The announcement of a defect is likely to decrease the demand for pickup trucks. This is represented by a leftward shift of the demand curve, as shown by the shift from $D_1$ to $D_2$, and causes the equilibrium price and quantity to fall as the equilibrium changes from $E_1$ to $E_2$.

c. The new supply schedule is as follows.

<table>
<thead>
<tr>
<th>Price of truck</th>
<th>Quantity of trucks supplied (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$20,000</td>
<td>9.3</td>
</tr>
<tr>
<td>25,000</td>
<td>10.0</td>
</tr>
<tr>
<td>30,000</td>
<td>10.7</td>
</tr>
<tr>
<td>35,000</td>
<td>11.3</td>
</tr>
<tr>
<td>40,000</td>
<td>12.0</td>
</tr>
</tbody>
</table>

This one-third decrease in the quantity supplied at any given price is shown as a leftward shift of the supply curve from $S_1$ to $S_2$. It results in a new, higher equilibrium price, $40,000 per truck, and a lower equilibrium quantity, 12 million trucks, as shown by the change of the equilibrium from $E_1$ to $E_3$. 
a. The cost of producing handmade acoustic guitars rises as more costly woods are used to construct them. This reduces supply, as luthiers offer fewer guitars at any given price. This is represented by a leftward shift of the supply curve and results in a rise in the equilibrium price and a fall in the equilibrium quantity.

b. This represents a rightward shift of the supply curve, resulting in a fall in the equilibrium price and a rise in the equilibrium quantity.

c. As more people demand music played on acoustic guitars, the demand for these guitars by musicians increases as well. (Acoustic guitars are an input into the production of this music.) This represents a rightward shift of the demand curve, leading to a higher equilibrium price and quantity.

d. If average American income falls sharply, then the demand for handmade acoustic guitars will decrease sharply as well because they are a normal good. This is represented by a leftward shift of the demand curve, leading to a lower equilibrium price and quantity.