After re-reading Chapter 4 in Mankiw, answer the following:

1. Explain why there is usually a direct relationship between quantity supplied and price.

2. List the shift variables of supply.

3. a. Show an increase in supply on a graph.
   b. Show a decrease in supply on a graph.

4. Using a separate graph for each, show the effects of the following on the **supply of autos**:
   a. Decrease in the price of steel
   b. Increase in wages of auto workers
   c. A foreign automaker enters the domestic market
   d. Government mandates that automakers install catalytic converters to reduce auto emissions

5. a. Draw a graph of a **market for gasoline** with an equilibrium price of $3.49 per gallon. Note: a market model requires both a supply schedule and a demand schedule.
   b. On a separate graph for each, show the effects of each of the following on price and quantity exchanged:
      
      (1) Increase in demand
      (2) Decrease in demand
      (3) Increase in supply
      (4) Decrease in supply

6. Using a separate graph for each case, show the effects of each of the following changes on the **market for autos**. As part of your analysis, state the shift variable for each.
   a. Increase in the price of gas
   b. A recession reduces average incomes
   c. Increase in the price of steel
   d. Auto makers install robots on assembly lines

7. Compare and contrast **complementary goods** with **inputs**: define each term, state the side of the market each affects, and give an example of each.

8. In terms of our shift variables of demand and supply, how are each of the following pairs related?
   a. Wheat and bread
   b. Butter and bread
   c. Peanuts and peanut butter
   d. Crackers and peanut butter
   e. Cotton and dress shirts
   f. Neckties and dress shirts
   g. Leather and shoes
   h. Socks and shoes
9. Explicitly show the effects of each of the following events on the price and quantity exchanged in the market indicated.

<table>
<thead>
<tr>
<th>Market</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Bread</td>
<td>Price of wheat falls</td>
</tr>
<tr>
<td>b. Bread</td>
<td>Price of butter falls</td>
</tr>
<tr>
<td>c. Peanut butter</td>
<td>Price of peanuts rises</td>
</tr>
<tr>
<td>d. Peanut butter</td>
<td>Price of jelly rises</td>
</tr>
<tr>
<td>e. Neckties</td>
<td>Price of silk rises</td>
</tr>
<tr>
<td>f. Dress shirts</td>
<td>Price of cotton rises</td>
</tr>
</tbody>
</table>

10. Compare and contrast income of consumers with wages of a particular group of workers: define each term, state the side of the market that each affects, and give an example of each.

11. Explicitly show the effects of the following changes on the price and quantity exchanged in the market indicated:

<table>
<thead>
<tr>
<th>Market</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Lobster</td>
<td>Increase in wages for lobster men</td>
</tr>
<tr>
<td>b. Lobster</td>
<td>Average income in the US rises</td>
</tr>
<tr>
<td>c. Cars</td>
<td>A recession with high unemployment occurs</td>
</tr>
<tr>
<td>d. Cars</td>
<td>Auto workers bargain for and receive higher wages</td>
</tr>
</tbody>
</table>

12. Show the effects of each of the following changes on the market for pizza. State the shift variable and explicitly show the changes in price and quantity exchanged.

a. Increase in the price of beer
b. Decrease in the price of fast food hamburgers
c. Increase in the price of cheese
d. A genetically engineered tomato is developed and produced

13. Click the Article Link under HW3 and read “The Role of Prices” by Walter Williams, then answer the following questions:

a. Pick a market Williams mentions and show the effects of Hurricane Katrina on a graph of that market.

b. “Rising prices get people to voluntarily economize on goods and services rendered scarcer by the disaster.” Explain and give an example.