1. (4 pts) What is the scarcity principle?

What is the incentives principle?

2. (12 pts) Suppose you grow tomatoes and sell them for $1/pound. Adding compost will increase your yield as shown in the table below.
   a. If the compost costs $3/pound, how many pounds of compost should you add to maximize your profit from selling tomatoes? Explain your reasoning.

   b. What if the price of compost fell to $2/pound?

   c. What if compost costs $2/pound and the price of tomatoes falls to $0.50/pound?

<table>
<thead>
<tr>
<th>Pounds of compost</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>30</td>
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<td>1</td>
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3. (8 pts) Define the following terms:
   a. Marginal cost
   b. Average cost
   c. Marginal benefit
   d. Average benefit

Chapter 2
4. (4 pts) What is the principle of comparative advantage?

What is the principle of increasing opportunity costs (aka the “low-hanging-fruit principle”)?

5. (8 pts) Define the following terms:
   a. Absolute advantage
   b. Comparative advantage

Circle true or false and explain:
   c. An individual or country must have absolute advantage in producing a good in order to have comparative advantage in producing that good. True or False?

   d. An individual or country must have comparative advantage in producing a good in order to have absolute advantage in producing that good. True or False?
6. (12 pts) Corey and Pat make or deliver pizzas with the following productivity:

<table>
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<td>6</td>
</tr>
<tr>
<td>Pat</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

a. Pat’s opportunity cost of delivering a pizza is that he cannot make ___ pizzas. Corey’s opportunity cost of delivering a pizza is that he cannot make ___ pizzas.

b. Pat’s opportunity cost of making a pizza is that he cannot deliver __ pizzas, Corey’s opportunity cost of making a pizza is that he cannot deliver __ pizzas.

c. ______ has an absolute advantage in making pizzas because

d. ______ has an absolute advantage in delivering pizzas because

e. ______ has a comparative advantage in making pizzas because

f. ______ has a comparative advantage in delivering pizzas because

Chapter 3
7. (4 pts) What is the efficiency principle?

What is the equilibrium principle (also know as the “no-cash-on-the-table principle”)?
8. (2 pts) Why are supply curves generally upward sloping?

Why are demand curves generally downward sloping?

9. (8 pts) Give an example of something that would cause each of the following:
   a. An increase in the demand for umbrellas
   b. A decrease in the demand for butter
   c. An increase in the supply of orange juice
   d. A decrease in the supply of hats

10. (4 pts) How would a new law mandating an increase in required levels of automobile insurance affect the equilibrium price and quantity in the market for new automobiles and why?

11. (8 pts) How does an increase in supply affect equilibrium price and quantity?

   How does an increase in demand affect equilibrium price and quantity?

What is the overall combined effect on equilibrium price and quantity of an increase in both supply and demand in the market for tofu?
12. (8 pts) Define the following terms:
   a. Price elasticity of demand
   b. Income elasticity of demand
   c. Cross price elasticity of demand
   d. Price elasticity of supply

13. (4 pts) Considering what determines the price elasticity of demand, why are students often offered discounts on many items such as movie tickets and airfares?

14. (2 pts) For a demand curve described by \( Q = 18 - 3P \), what is the price elasticity of demand at:
   a. Price \( P = $4 \)?
   b. Price \( P = $3 \)?
Chapter 5
15. (4 pts) What is the law of demand?

What is the law of diminishing marginal utility?

16. (4 pts) Define the following terms:
   a. Marginal utility

   b. Consumer surplus

17. (4 pts) Toby’s current marginal utility from consuming peanuts is 100 utils per ounce and his marginal utility from consuming cashews is 200 utils per ounce. If peanuts cost 20 cents per ounce and cashews cost 50 cents per ounce, is Toby maximizing his total utility from the kinds of nuts he eats? Is so, explain how you know. If not, how should he rearrange his spending according to the rational spending rule?

Bonus
18. (2 pts) Describe what the experiment we did in class demonstrated.

On my honor as an Aggie, I have neither given nor received unauthorized aid on this exam.

   Signature ______________________

   -6-
Chapter 1
1. (4 pts) What is the scarcity principle (also called the “no-free-lunch principle”)?

Answer: Limited resources means having more of one good requires having less of another.

What is the incentives principle?

Answer: Individuals respond to incentives: they are more likely to take an action when the benefit rises and less likely to take an action when the cost rises.

2. (12 pts) Suppose you grow tomatoes and sell them for $1/pound. Adding compost will increase your yield as shown in the table below.

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a. If the compost costs $3/pound, how many pounds of compost should you add to maximize your profit from selling tomatoes? Explain your reasoning.

Answer: 5 pounds of compost. The marginal cost of a pound of compost is $3. Need at least three more pounds of tomatoes sold at $1/pound for the marginal benefit to cover the marginal cost. 5 pounds of compost grows 73 instead of 70
pounds of tomatoes with 4 pounds of compost. For all units up to 5 pounds of compost, the marginal benefit exceeds the marginal cost.

b. What if the price of compost fell to $2/pound?

Answer: 6 pounds of compost. Now need two more pounds of tomatoes at $1/pound to cover marginal cost of compost of $2/pound. 75 pounds of tomatoes with 6 pounds of compost versus 73 pounds of tomatoes with 5 pounds of compost.

c. What if compost costs $2/pound and the price of tomatoes falls to $0.50/pound?

Answer: 4 pounds of compost. Now need 4 more pounds of tomatoes at $0.50/pound to cover the marginal cost of compost of $2/pound. 70 pounds of tomatoes with 4 pounds of compost versus 66 pounds of tomatoes with 3 pounds of compost.

3. (8 pts) Define the following terms:
   a. Marginal cost

   Answer: The increase in total cost that results from one additional unit.

   b. Average cost

   Answer: The total cost of an activity divided by the number of units.

   c. Marginal benefit

   Answer: The increase in total benefit the results from one additional unit.

   d. Average benefit

   Answer: The total benefit of an activity divided by the number of units.
Chapter 2
4. (4 pts) What is the principle of comparative advantage?

Answer: Everyone does best when each individual concentrates on activities for which their opportunity costs are lowest.

What is the principle of increasing opportunity costs (aka the “low-hanging-fruit principle”)?

Answer: When expanding production of a good, use resources with the lowest opportunity cost first.

5. (8 pts) Define the following terms:
   a. Absolute advantage

Answer: An individual has absolute advantage if he or she takes fewer hours to perform a task than the other person.

b. Comparative advantage

Answer: An individual has a comparative advantage if his or her opportunity cost of performing a task is lower than the other person’s opportunity cost.

Circle true or false and explain:
   c. An individual or country must have absolute advantage in producing a good in order to have comparative advantage in producing that good. True or False?

Answer: False. An individual can have a lower opportunity cost of and hence comparative advantage in producing a good without having absolute advantage in producing the good because opportunity cost is a ratio of unit labor requirements across two goods.

d. An individual or country must have comparative advantage in a producing a good in order to have absolute advantage in producing that good. True or False?

Answer: False again for the same reason.
6. (12 pts) Corey and Pat make or deliver pizzas with the following productivity:

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a. Pat’s opportunity cost of delivering a pizza is that he cannot make \(\frac{2}{3}\) pizzas. Corey’s opportunity cost of delivering a pizza is that he cannot make 2 pizzas.

b. Pat’s opportunity cost of making a pizza is that he cannot deliver \(\frac{3}{2}\) pizzas, Corey’s opportunity cost of making a pizza is that he cannot deliver \(\frac{1}{2}\) pizzas.

c. Corey has an absolute advantage in making pizzas because Corey can make 12 pizzas in an hour whereas Pat can make only 2: Corey takes 5 minutes to make a pizza versus Pat needs 30 minutes.

d. Corey also has an absolute advantage in delivering pizzas because Corey can deliver 6 pizzas in an hour whereas Pat can deliver only 3: Corey takes 10 minutes to deliver a pizza versus Pat needs 20 minutes.

e. Corey has a comparative advantage in making pizzas because his opportunity cost of making a pizza (\(\frac{1}{2}\) pizza not delivered) is less than Pat’s opportunity cost of \(\frac{3}{2}\).

f. Pat has a comparative advantage in delivering pizzas because his opportunity cost of delivering a pizza (\(\frac{2}{3}\) pizza not made) is less than Corey’s opportunity cost of 2.

Chapter 3
7. (4 pts) What is the efficiency principle?

Answer: Efficiency is an important social goal because when the economic pie grows larger, everyone can have a larger slice.

What is the equilibrium principle (also know as the “no-cash-on-the-table principle”)?

Answer: When in equilibrium, markets leave no unexploited opportunities for individuals. All goods are sold that someone values more than costs to produce.
8. (2 pts) Why are supply curves generally upward sloping?

*Answer:* The supply curve indicates the quantity that sellers want to sell and each price. Additional units are usually more costly to produce because sell units with the lowest opportunity cost first.

Why are demand curves generally downward sloping?

*Answer:* The demand curve indicates the quantity that buyers wish to buy at each price. Buyers have different reservation prices - the most they are willing to pay for a unit of the good. The higher the price of the good, fewer people will find that the benefit is worth its cost. Some people will switch to substitutes or buy less overall.

9. (8 pts) Give an example of something that would cause each of the following:

a. An increase in the demand for umbrellas

*Answer:* More rainy weather

b. A decrease in the demand for butter

*Answer:* Reduction in the price of margarine, a substitute.

c. An increase in the supply of orange juice

*Answer:* An improved technology for harvesting oranges.

d. A decrease in the supply of hats

*Answer:* Increase in the cost of an input such as the material or the workers.

10. (4 pts) How would a new law mandating an increase in required levels of automobile insurance affect the equilibrium price and quantity in the market for new automobiles and why?

*Answer:* Demand for new automobiles would likely decrease, causing a reduction in the equilibrium price and quantity.
11. (8 pts) How does an increase in supply affect equilibrium price and quantity?

*Answer*: Equilibrium price falls and quantity rises.

How does an increase in demand affect equilibrium price and quantity?

*Answer*: Equilibrium price and quantity both rise.

What is the overall combined effect on equilibrium price and quantity of an increase in both supply and demand in the market for tofu?

*Answer*: Equilibrium quantity clearly rises. Equilibrium price could rise or fall.

**Chapter 4**

12. (8 pts) Define the following terms:

a. Price elasticity of demand

*Answer*: The percentage change in the quantity demanded of a good in response to a one percent increase in the price of the good.

b. Income elasticity of demand

*Answer*: The percentage change in the quantity demanded of a good in response to a one percent increase in income.

c. Cross price elasticity of demand

*Answer*: The percentage change in the quantity demanded of one good in response to a one percent increase in the price of another good.

d. Price elasticity of supply

*Answer*: The percentage change in the quantity supplied of a good in response to a one percent increase in the price of the good.

13. (4 pts) Considering what determines the price elasticity of demand, why are students often offered discounts on many items such as movie tickets and airfares?
Answer: Students may have lower incomes and hence these items may be a larger share of their budget. They may also have better substitution possibilities.

14. (2 pts) For a demand curve described by \( Q = 18 - 3P \), what is the price elasticity of demand at:
   a. Price \( P = $4 \)?

   Answer: Rearranged in slope-intercept form \( P = 6 - Q/3 \) so slope is \( 1/3 \). At \( P = $4 \), \( Q = 18 - 3(4) = 18 - 12 = 6 \). Price elasticity of demand is \( \epsilon = (P/Q) \times (1/slope) = (4/6) \times 3 = 2 \).

   b. Price \( P = $3 \)?

   Answer: At \( P = $3 \), \( Q = 18 - 3(3) = 18 - 9 = 9 \). Price elasticity of demand is \( \epsilon = (P/Q) \times (1/slope) = (3/9) \times 3 = 1 \).

Chapter 5
15. (4 pts) What is the law of demand?

   Answer: People do less of of an activity as the cost rises.

What is the law of diminishing marginal utility?

   Answer: The additional utility from consuming one more unit of a good tends to diminish as consumption increases (beyond some point).

16. (4 pts) Define the following terms:
   a. Marginal utility

   Answer: The additional utility gained from consuming one additional unit of a good.

   b. Consumer surplus

   Answer: The difference between a buyer's reservation price (maximum willing to pay) for a product and the price actually paid.
17. (4 pts) Toby’s current marginal utility from consuming peanuts is 100 utils per ounce and his marginal utility from consuming cashews is 200 utils per ounce. If peanuts cost 20 cents per ounce and cashews cost 50 cents per ounce, is Toby maximizing his total utility from the kinds of nuts he eats? Is so, explain how you know. If not, how should he rearrange his spending according to the rational spending rule?

Answer: The rational spending rule requires marginal utility per dollar to be equalized. Toby’s marginal utility per dollar for peanuts is $\frac{100}{0.20} = 500$ and for cashews is $\frac{200}{0.50} = 400$. Toby should consume less cashews and more peanuts.

Bonus
18. (2 pts) Describe what the experiment we did in class demonstrated.

Answer: We saw how the invisible hand guides markets to roughly the correct equilibrium price and quantity and achieves economic efficiency. Following a reduction in supply, the price rose and quantity fell as predicted by economic theory.