Chapter 3 Practice Problems

Elements of Microeconomics (discussion section 4)

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Question 1

Muffin's Steakhouse and Sandy's Salads are two restaurants which serve salads and steaks, respectively. Given 1000 minutes of labor time, they can produce the following amounts of each dish:

Restaurant	Steaks	Salads
Muffin's Steakhouse	100	20
Sandy's Salads	200	100

Table 1: Muffin vs. Sandy

1. What is their cost, in minutes, to produce steak and salads?

   Answer:

Restaurant	Minutes per steak	Minutes per salad
Muffin's Steakhouse	10	50
Sandy's Salads	5	10

Table 2: Muffin vs. Sandy

2. Assume that there is a *constant transferability* of productive resources from one dish to the other:

   (a) Draw the production possibility frontiers for the two restaurants.

   (b) Who has the absolute advantage in producing steaks?

   (c) Who has the absolute advantage in producing salads?

   Answer:

   a. The two PPFs should look like figures 1 and 2.

   b. and c. Sandy has the absolute advantage in both dishes, since the time that it takes her to produce both steaks and salads is less than the time that it takes Sue to produce the dishes.

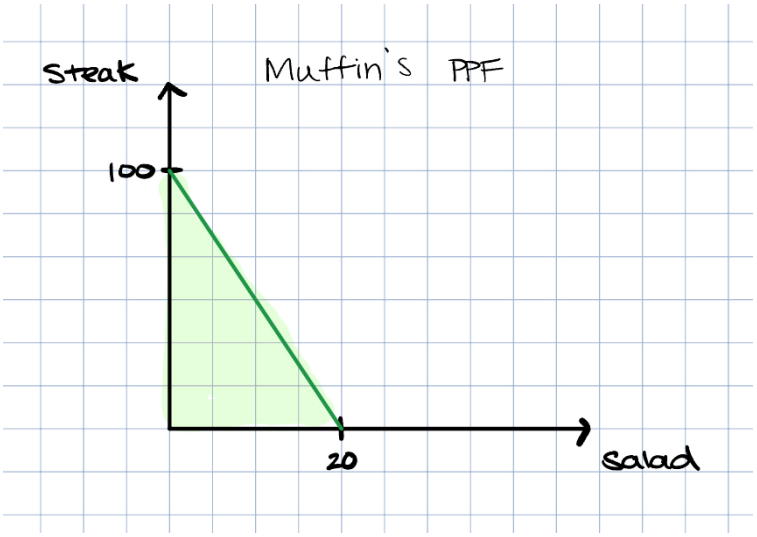

Figure 1: PPF of Muffin's Steakhouse

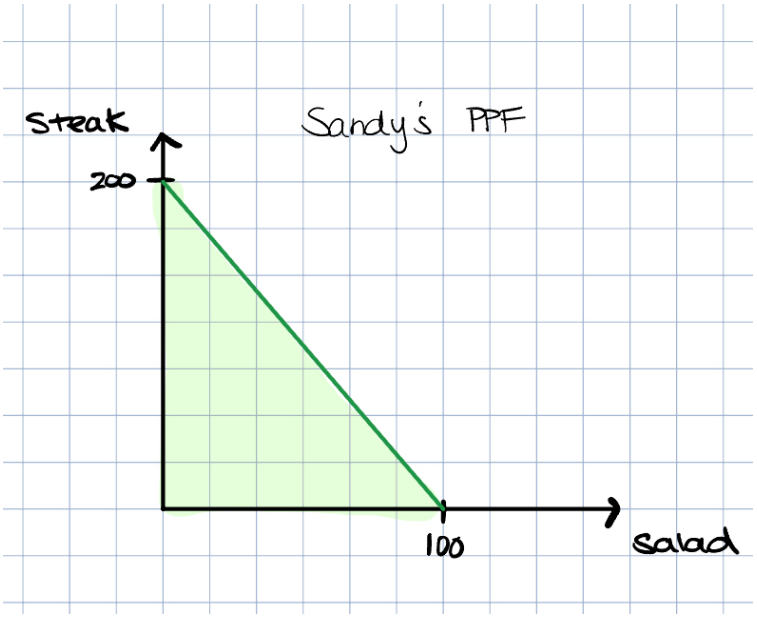

Figure 2: PPF of Sandy's Salads

3. Let's think about the opportunity cost of each firm for each dish:

   (a) What are the slopes of the two PPFs?

   (b) What is Muffin's opportunity cost for producing steaks and salads?

   (c) What is Sandy's opportunity cost for producing steaks and salads?

   Answer:

   a. The slope of Muffin's PPF is -5 and the slope of Sandy's PPF is -2. Muffin: $\frac{-100}{20} = -5$ Sandy: $\frac{-200}{100} = -2$

   b. Muffin faces an opportunity cost to produce 1 steak of

$$oc = \frac{\Delta salad}{\Delta steak} = \frac{20-0}{100-0} = \frac{20}{100} = \frac{1}{5}$$

   of a salad. The opportunity cost to produce 1 salad, on the other hand, is 5 steaks ($oc = \frac{\Delta steak}{\Delta salad} = \frac{100-0}{20-0} = \frac{100}{20} = 5$). Notice that the opportunity cost of one dish is the inverse of the other.

   c. Sandy faces an opportunity cost to produce 1 steak of

$$oc = \frac{\Delta salad}{\Delta steak} = \frac{100-0}{200-0} = \frac{100}{200} = \frac{1}{2}$$

   of a salad, and the opportunity cost to produce 1 salad of

$$oc = \frac{\Delta steak}{\Delta salad} = \frac{200-0}{100-0} = \frac{200}{100} = \frac{2}{1} = 2$$

   steaks.

4. (a) Can a firm have an absolute advantage in both goods?

   (b) Can a firm have a comparative advantage in both goods?

   (c) What is the relationship between the comparative advantage in good A and good B?

   Answer:

   a. Yes; in our example, Sandy has the absolute advantage for both goods.

   b. No; if one firm has a comparative advantage with one good, that relationship is flipped for the other good.

   c. They are *inverses*, and this underlies the answer to question 2. This is because of how fractions work, but there is clear intuition: if the opportunity cost for good A is really small, then the opportunity cost for good B must be very large.

5. Since most customers like to order a salad with their steak, Sandy and Muffin both want to offer both salads and steaks (not necessarily in equal quantities since some customers will only want one or the other).

   (a) If both restaurants spend half their resources on each dish, what is their output?

   (b) Assume the two businesses can trade. What is one set of productions, and one possible exchange, which would leave them both better off?

Answer:

a. If they divide their 1000 minutes evenly between the two goods their output is given in table 3.

Restaurant	**Steaks**	**Salads**
Muffin's Steakhouse	50	10
Sandy's Salads	100	50
Total output	150	60

Table 3: 50/50 split

b. There are many possible answers here (in fact, an infinite number), and I will only present one.

Thinking at the margin (like a good economist), let's just see what happens when we have each restaurant make a small move towards producing more of the good for which they have a comparative advantage:

- Muffin produces 1 fewer salads and 5 more steaks
- Sandy produces 2 fewer steaks, and 1 more salad

Then their production is:

Restaurant	**Steaks**	**Salads**
Muffin's Steakhouse	55	9
Sandy's Salads	98	51
Total output	153	60

Table 4: Possible trade

So total production has gone up; we still have 60 salads total, but now we have 153 steaks instead of 150. Again, there are an infinite number of possible trades, but one easy example is having Muffin trade 3 steaks to Sandy in exchange for one salad:

They both have the same amount of salads as before, but more steaks! So even without knowing anything about the prices that they sell these dishes for, we can say that they are each better off.

Restaurant	Steaks	Salads
Muffin's Steakhouse	52	10
Sandy's Salads	101	50

Table 5: Gains of trade

6. We can think of the price of salads in terms of steaks in the above trade as 1 salad to 3 steaks. Would this trade still be profitable if:

   (a) The price of 1 salad was 3.5 steaks?

   (b) The price of 1 salad was 1 steak?

   (c) The price of 1 salad was 6 steaks?

   Answer:

   We know that only prices that lie within the interval of comparative advantages will enable a trade which leaves everyone better off. Above we said that Muffin faces an opportunity cost of 2 steaks, and Sandy faces an opportunity cost of 5 steaks; so option 1 will work, but options 2 and 3 are respectively too low and too high.

   Think about the intuition: Muffin might not be very good at making salads, but if Sandy is charging him a sufficiently high price, there will come a point at which he just decides to make his own instead of trading with her.

Question 2

Joseph can peel a pound of potatoes in 10 minutes and wash a load of dishes in 15. Mary can do both of these tasks twice as fast.

Which person should do more of which task? (Don't worry about specific numbers.)

Answer:

In this instance, it doesn't matter; Joseph and Mary face the exact same opportunity costs. We could write this out, but we only need to recognize that the time they take for the two tasks is directly proportional since the questions says Mary can do both of them "twice as fast."

Question 3

Joseph can peel a pound of potatoes in 10 minutes and wash a load of dishes in 15. Mary can also wash the dishes in 15 minutes, but it takes her only 5 minutes to peel the potatoes.

1. (a) What is each person's opportunity cost of peeling potatoes?

   (b) Who has an absolute advantage in washing the dishes?

   (c) Who has a comparative advantage in washing the dishes?

(d) If the two workers try and split up the tasks in an advantageous way, who will do more of which job?

Answer:

a. It takes Joseph 10 minutes to peel a pound of potatoes, in which time he could have washed

$$oc = \frac{10-0}{15-0} = \frac{10}{15} = \frac{2}{3}$$

a load of dishes. Mary can wash only

$$\frac{5-0}{15-0} = \frac{5}{15} = \frac{1}{3}$$

a load of dishes in the time it takes her to peel a pound of potatoes. Simply take the inverse to find their opportunity costs of washing dishes in terms of peeling potatoes. *(whatever you want the opportunity cost in terms of will be the denominator in the calculation)*

b. Neither. Both are equally efficient in washing the dishes

c. Based on our answer to 1, it is clear that Mary has a higher opportunity cost to wash dishes since she can peel 3 pounds of potatoes (instead of 1.5) in the 15 minutes it takes either Mary or Joseph to wash the dishes. SO, Joseph has the comparative advantage in washing the dishes.

d. Since Mary has the smaller opportunity cost to peel potatoes, she will wash fewer dishes than Joseph in an advantageous division of labor. (Mary has the comparative advantage in peeling potatoes since her opportunity cost of peeling potatoes in terms of washing dishes is $\frac{1}{3}$ which is less than Joseph's $\frac{2}{3}$.

2. Think about the price of peeling potatoes in terms of washing dishes. What is the maximum price at which a trade could leave both workers better off? What is the minimum price?

Answer:

We know to look at the opportunity cost to determine the range of possible prices. The lowest possible price will be $\frac{1}{3}$ laods of dishes washed, and the highest will be $\frac{2}{3}$.

Bonus: Now think about the price of washing dishes in terms of peeling potatoes. What is the range of possible prices? What is the relationship between the range of possible prices in this instance, vs. what we derived above?