Week 2 Discussion Section - Solutions

Part 1

As the manager at a local florist, you supervise two employees, Anita and Jerome. There are two tasks that need to be completed: floral arrangements and flower delivery. It takes Anita 30 minutes to finish one floral arrangement and it takes her 40 minutes to make one delivery. It takes Jerome 10 minutes to finish one floral arrangement and it takes him 30 minutes to make one delivery.

1. Who has absolute advantage in each task?

   Jerome has absolute advantage in both tasks because he requires fewer resources (time).

   Floral arrangement: 10 minutes < 30 minutes

   Flower delivery: 30 minutes < 40 minutes

2. What are Anita and Jerome's opportunity costs of making one floral arrangement?

   Anita: opportunity cost of one floral arrangement = $\frac{30}{40} = \frac{3}{4}$ of a flower delivery.

   Jerome: opportunity cost of one floral arrangement = $\frac{10}{30} = \frac{1}{3}$ of a flower delivery.

3. What are Anita and Jerome's opportunity costs of making one flower delivery?

   Anita: opportunity cost of one flower delivery = $\frac{40}{30} = \frac{4}{3} = 1\frac{1}{3}$ floral arrangements.

   Jerome: opportunity cost of one flower delivery = $\frac{30}{10} = 3$ floral arrangements.

4. Who has comparative advantage in floral arrangements? What about flower deliveries?

   Jerome has comparative advantage in floral arrangements because his opportunity cost is lower:

   $$\frac{1}{3} \text{ of a flower delivery} < \frac{3}{4} \text{ of a flower delivery}$$

   Anita has comparative advantage in flower deliveries because her opportunity cost is lower:

   $$1\frac{1}{3} \text{ floral arrangements} < 3 \text{ floral arrangements}$$

5. Suppose, initially, Jerome and Anita each spent 4 hours each day doing floral arrangements and 2 hours each day doing deliveries. If you changed their tasks so that each employee did nothing but the task for which they had a comparative advantage, how many more floral arrangements would your store make, and how many more flower deliveries?

   Original distribution of tasks:

   Floral arrangements: $\frac{240\ min}{30\ min/task} + \frac{240\ min}{10\ min/task} = 8 + 24 = 32$ floral arrangements

   Flower deliveries: $\frac{120\ min}{40\ min/task} + \frac{120\ min}{30\ min/task} = 3 + 4 = 7$ flower deliveries

   New distribution of tasks:

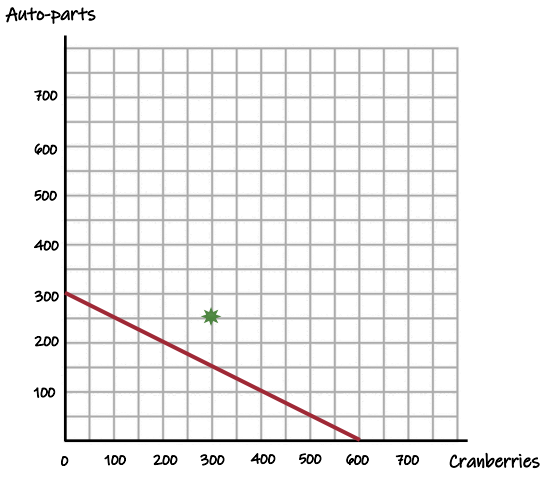
   Floral arrangements: $\frac{360\ min}{10\ min/task} = 36$ floral arrangements → **6 more!**

   Flower deliveries: $\frac{360\ min}{40\ min/task} = 9$ flower deliveries → **2 more!**

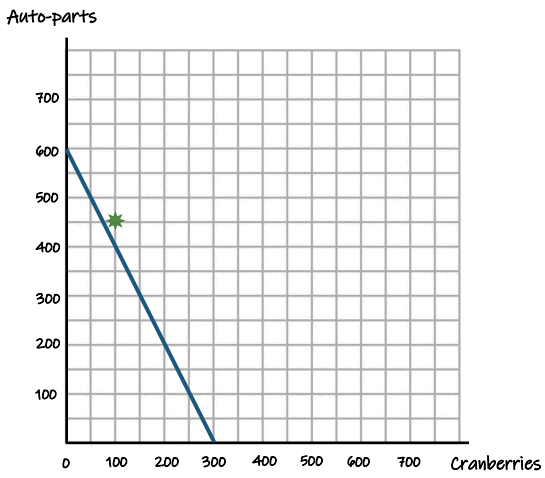
Part 2

Consider the two Midwestern states, Wisconsin and Michigan. Below are their production possibilities frontiers for cranberries and auto-parts.

Wisconsin's Production Possibilities Frontier



Michigan's Production Possibilities Frontier



Currently, Wisconsin produces 400 bushels of cranberries and 100 auto-parts; Michigan produces 0 bushels of cranberries and 600 auto-parts. Suppose that Wisconsin and Michigan decide to trade 100 bushels of cranberries for 150 auto-parts.

6. Which state should export cranberries? Which state should export auto-parts?

   Observe:

   - Wisconsin's opp. cost of 1 bushel of cranberries = 1/2 an auto-part
   - Michigan's opp. cost of 1 bushel of cranberries = 2 auto-parts

   Wisconsin has comparative advantage in cranberries and should export them.

   - Wisconsin's opp. cost of 1 auto-part = 2 bushels of cranberries
   - Michigan's opp. cost of 1 auto-part = 1/2 a bushel of cranberries

   Michigan has comparative advantage in auto-parts and should export them.

7. Will both states gain from this trade? How do you know?

   They will both gain from this trade. Terms of trade imply that 1 bushel of cranberries is traded for 1.5 auto-parts. 1.5 falls between the two states' opportunity cost of a bushel of cranberries, so they are both happy with the trade.

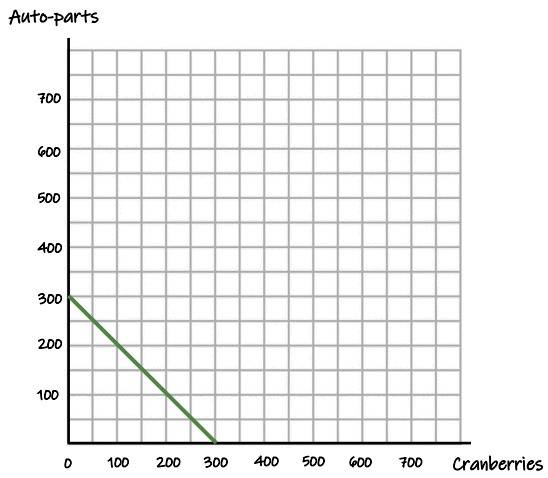
   You can also graph the final consumption of each state (see stars in above PPFs) and observe that it is "beyond the frontier."

Now suppose that Wisconsin and Michigan decide to merge into the mega-state "Wischigan".

8. Given the two states' individual production possibilities, form the joint production possibilities frontier for Wischigan on the graph on page 4. Make sure to accurately label all intersection points and slopes.

Wischigan is now considering merging with Indiana to form the even larger midwestern mega-state "Wiscindigan". Indiana has the following production possibilities frontier for cranberries and auto-parts.

Indiana Production Possibilities Frontier



9. Given the three states' individual production possibilities, form the joint production possibilities frontier for Wiscindigan on the graph on page 5. Make sure to accurately label all intersection points and slopes.

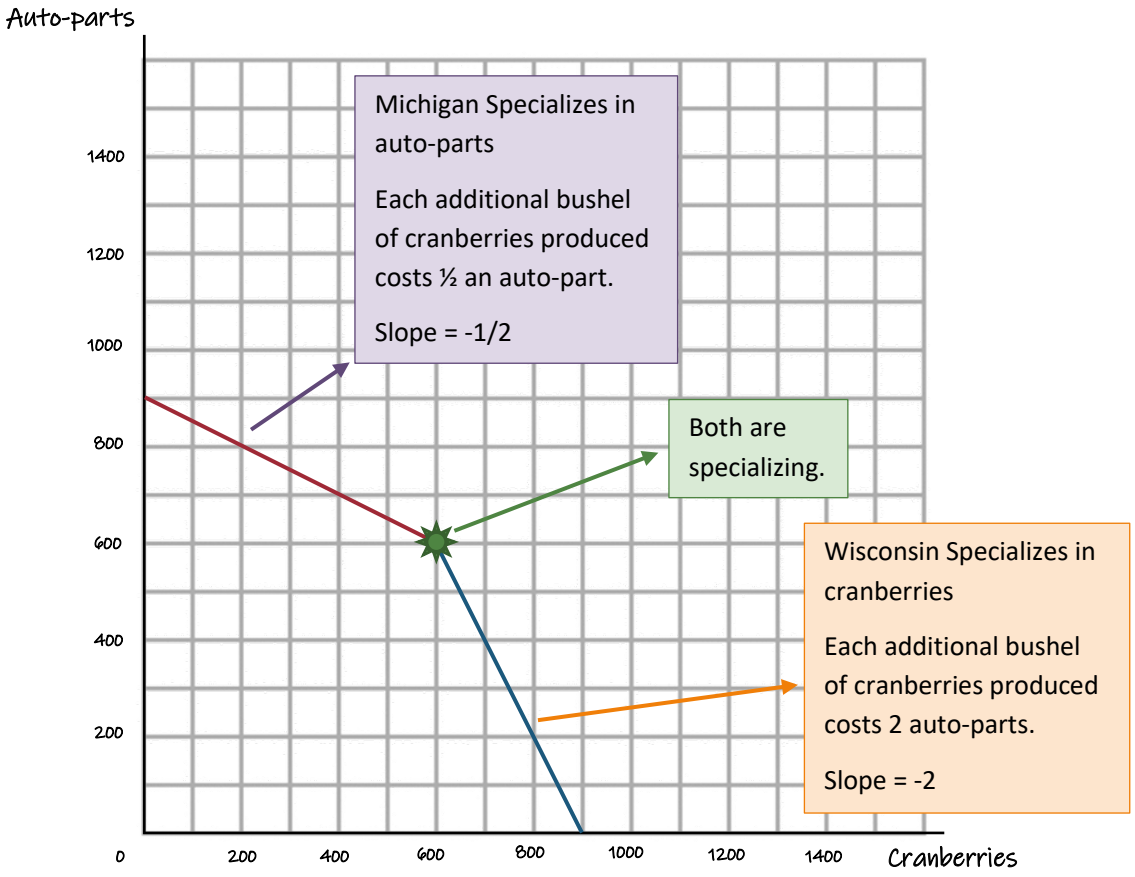
10. Explain why the joint production possibilities frontier for Wiscindigan has this shape. Specifically, how does the shape relate to opportunity cost and specialization?

    The joint PPF's slope is increasing in magnitude as more cranberries (and fewer auto-parts are produced). This "bowed shape" exists for the following reasons:

    1. If fewer than 600 bushels of cranberries are produced, then Wisconsin is solely responsible (they are the lowest cost state). T the cost of producing 1 additional bushel of cranberries in this region of the PPF is ½ an auto-part.
    2. However, if between 600 and 900 bushels of cranberries are produced, then Indiana must produce cranberries as well (they are the second lowest cost state). The cost of producing 1 additional bushel of cranberries in this region of the PPF is 1 auto-part.
    3. Finally, if more than 900 bushels of cranberries are produced, then Michigan must produce cranberries as well (they are the highest cost state). The cost of producing 1 additional bushel of cranberries in this region of the PPF is 2 auto-parts.

    The cost of production is rising as more cranberries are produced. Ultimately, this is because workers (states) that should specialize in auto-parts manufacturing are forced to produce cranberries even though they are far less productive in that task.

Wischigan Production Possibilities Frontier



Wiscindigan Production Possibilities Frontier