1. Joel Tuoroniemi, a U.S. citizen, purchases a phone from AT&T for $300. The following table gives costs associated with the phone supply chain. By how much did Joel's purchase change the U.S. trade balance with China?

<table>
<thead>
<tr>
<th>Component/process</th>
<th>Source country</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard drive</td>
<td>Japan</td>
<td>$75</td>
</tr>
<tr>
<td>Display module</td>
<td>Taiwan</td>
<td>$25</td>
</tr>
<tr>
<td>Video chip</td>
<td>U.S.</td>
<td>$20</td>
</tr>
<tr>
<td>Controller chip</td>
<td>U.S.</td>
<td>$10</td>
</tr>
<tr>
<td>Assembly</td>
<td>China</td>
<td>$20</td>
</tr>
<tr>
<td>Wholesale distribution</td>
<td>U.S. (Apple)</td>
<td>$100</td>
</tr>
<tr>
<td>Retail distribution</td>
<td>U.S. (AT&amp;T)</td>
<td>$50</td>
</tr>
<tr>
<td>Retail price</td>
<td></td>
<td>$300</td>
</tr>
</tbody>
</table>

2. Which of the following is the most likely explanation for a Detroit construction company's imports of Canadian concrete blocks made in Windsor, Ontario?
   a. the Ricardian model
   b. offshoring
   c. technology
   d. proximity

3. If the maximum number of yards of cloth produced is 300 and the maximum number of ears of corn produced is 600, then with a $MPL_{cloth} = 2$, what is the $MPL_{corn}$?

4. Poland requires 4 hours of labor to produce a ton of coal and 10 hours of labor to produce 10 bushels of wheat. The Czech Republic requires 6 hours of labor to produce a ton of coal and 10 hours of labor to produce 10 bushels of wheat.
   a. The international price of wheat must fall between which two prices below?
      i. between 1/6 ton and 1/4 ton of coal per bushel of wheat
      ii. between 1 2/3 ton and 2 1/2 tons of coal per bushel of wheat
      iii. between 1/6 hour and 1/4 hour of labor per bushel of wheat
      iv. between 4 tons and 6 tons of coal per bushel of wheat
   b. Suppose that the international price of coal is 4 1/4 bushels of wheat per ton of coal. Which country is likely to have the largest gains from trade?
   c. Suppose that Poland has 1,000 hours of labor and that it completely specializes according to its comparative advantage. How many units of which product will it produce?
5. Chile and Argentina each produce jellybeans and peanut butter using labor as their only resource. Each country has 1,000 hours of labor. In Chile, 1 hour produces 1 pound of jellybeans and 2 hours produce 1 pound of peanut butter. In Argentina, 1 hour produces 1 pound of jellybeans and 3 hours produces 1 pound of peanut butter. When they do not trade with each other, Chile consumes 600 pounds of jellybeans and 200 pounds of peanut butter, and Argentina consumes 400 pounds of jellybeans and 200 pounds of peanut butter.
   a. Which country has an absolute advantage in jellybean production?
   b. What is the price of peanut butter in Argentina before the two countries begin to trade with each other?
   c. In order for Chile to gain from trade, what must the price of jellybeans be less than?
   d. Argentina's gains from trade will be largest when the price of jellybeans is what?
   e. What is the opportunity cost of a pound of peanut butter in Chile?
   f. Now suppose that the two countries begin to trade with one another. Each completely specializes in the product in which it finds its comparative advantage. How many pounds of peanut butter and jellybeans do the two countries jointly produce?

6. Using the following information about the price of agriculture and manufacturing goods in two countries (Home and Foreign), what happens when the two countries open their markets for trade?

<table>
<thead>
<tr>
<th>Home Country</th>
<th>Foreign Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>$P_m$</td>
<td>$5$</td>
</tr>
<tr>
<td>$P_a$</td>
<td>$3$</td>
</tr>
<tr>
<td>$P_{m*}$</td>
<td>$7$</td>
</tr>
<tr>
<td>$P_{a*}$</td>
<td>$3$</td>
</tr>
</tbody>
</table>

7. Suppose that the Home country in the two-sector (manufacturing and agriculture) specific-factors model has a comparative advantage in agricultural output. Will workers be better or worse off following the opening of trade with other countries?

8. According to the information in the table below, if the price of the agriculture good decreases to $5, then what happens to the wage rate in each sector?

<table>
<thead>
<tr>
<th>Marginal Product of Labor in Agriculture (MPL_a)</th>
<th>Marginal Product of Labor in Manufacturing (MPL_m)</th>
<th>Price of Agriculture good (P_a)</th>
<th>Price of Manufacturing good (P_m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>3</td>
<td>$10</td>
<td>$10</td>
</tr>
</tbody>
</table>
9. France and Italy only trade with each other; each produces wine and bread. The production of bread is relatively capital intensive, and the production of wine is relatively labor intensive. France is relatively abundant in capital, and Italy is relatively abundant in labor. According to the HO model, what is the impact of free trade between Italy and France on prices in each country?

10. According to the Stolper-Samuelson theorem, would you expect all workers across the globe to favor limiting trade? Why or why not?

11. In the Heckscher-Ohlin model with two goods and two factors, what will an increase in one factor cause?

12. According to the Rybczynski theorem, what will immigration of unskilled labor from Mexico to the United States cause?

13. China has 1,000 units of capital and 3,000 workers; the United States has 3,000 units of capital and 1,000 workers; clothing production is labor intensive; and chemical production is capital intensive. Suppose that the United States eliminates all restrictions on immigration and Chinese workers are free to emigrate from China to the United States. How many Chinese workers must emigrate from China to the United States in order for factor price equalization to occur?

14. Suppose that an economy has 1,500 units of capital and 1,000 workers. This economy produces computers and shirts. Computer production requires 4 units of capital per worker and shirt production requires 1 unit of capital per worker. 
   a. Solve for the amount of labor and capital used in each industry.
   b. Suppose that the number of workers increases to 1,250 due to immigration, keeping total capital fixed at 1,500. Solve for the distribution of labor and capital between the two sectors.

15. ABC Corporation is a monopolistic competitor. It has fixed costs of $5,000 and a constant marginal cost of $500 per unit of production. It faces a demand curve described by \( P = 1,000 - 10Q \).
   a. Find ABC’s equilibrium price and quantity.
   b. Will it earn monopoly profits at this equilibrium?
   c. What will happen to ABC’s price, quantity, and monopoly profits in the long run?

16. Why would you expect firms with high research and development costs to be more interested in free trade?
17. This is a table of imports and exports of commodities for the United States.

<table>
<thead>
<tr>
<th>Product</th>
<th>Value of Imports ($million)</th>
<th>Value of Exports ($million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golf Clubs</td>
<td>$305.8</td>
<td>$318.7</td>
</tr>
<tr>
<td>Large passenger aircraft</td>
<td>7000</td>
<td>18,821.5</td>
</tr>
<tr>
<td>Fax machines</td>
<td>271.8</td>
<td>150.2</td>
</tr>
<tr>
<td>Men's shorts</td>
<td>701.3</td>
<td>12.1</td>
</tr>
</tbody>
</table>

a. What is the intra-industry trade index for large passenger aircraft?
b. What is the intra-industry trade index for fax machines?
c. Which industry has the lowest intra-industry trade index?

18. Use Figure 1 to answer

Figure 1: With and Without Offshoring

a. Can the combination of output shown by the isoquant, $Y_1$, be achieved and if so, how?
b. What is likely to happen if the relative price of components is cheaper in a foreign country than the home country?
c. What is the exchange result of the following scenario? The home country offshores components to a foreign country and then exports R&D to the foreign country and imports components from the foreign country.
d. What will happen to the relationship of R&D and components if the world price of components falls?
e. If the price of R&D decreases, what is likely to happen in the home country?

19. What prevents the skill-abundant country from offshoring all parts of the value chain?
20. The table below represents a demand and supply schedule for a small-country producer of iron ore. It sells output in its home market and on the world market at the world price of $70 per ton.

**Table: Demand and Supply for Iron Ore**

<table>
<thead>
<tr>
<th>Price/Ton</th>
<th>Quantity Demanded (Tons)</th>
<th>Quantity Supplied (Tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$100</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>$90</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>$80</td>
<td>30</td>
<td>80</td>
</tr>
<tr>
<td>$70</td>
<td>40</td>
<td>70</td>
</tr>
<tr>
<td>$60</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>$50</td>
<td>60</td>
<td>50</td>
</tr>
<tr>
<td>$40</td>
<td>70</td>
<td>40</td>
</tr>
<tr>
<td>$30</td>
<td>80</td>
<td>30</td>
</tr>
<tr>
<td>$20</td>
<td>90</td>
<td>20</td>
</tr>
<tr>
<td>$10</td>
<td>100</td>
<td>10</td>
</tr>
</tbody>
</table>

a. At the world price of $70 per ton, how many units will be sold domestically?
b. At the world price of $70 per ton, how many units will it export?
c. Suppose that the country's government offers its iron ore producers an export subsidy of $10 per ton. How many tons will the country now export?
d. How many tons will be sold domestically when exporters receive a $10-per-ton export subsidy?
e. What price will domestic iron ore consumers pay for their iron ore purchases when there is a $10-per-ton export subsidy?
f. What is the total value of the export subsidy that exporters receive?

21. In the small country of Freedonia, the domestic demand for widgets is represented by P = 100 – 3Q; the home supply of widgets is represented by P = 1Q.

a. In the absence of trade, what is the equilibrium price and quantity in Freedonia's widget market?
b. Now suppose Freedonia engages in international trade in widgets. The world price is $40. How many widgets will be consumed domestically and how many will be exported?
c. Now let the government of Freedonia give a $15 per unit subsidy on each widget exported. What will be the new price and quantity consumed in the Freedonia domestic market?
d. Calculate the value of the deadweight losses with the $15 per unit export subsidy.
e. What is the value of total subsidy payments to Freedonia's widget exporters?
f. Is the subsidy paid to Freedonias's widget exporters considered part of the deadweight losses of the subsidy?
22. The graph below shows the case for a tariff imposed by a large country.

<table>
<thead>
<tr>
<th>Price</th>
<th>26</th>
<th>30</th>
<th>36</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity</td>
<td>20</td>
<td>40</td>
<td>80</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>World market</th>
<th>Imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x^*$</td>
<td>$x^* + t$</td>
</tr>
</tbody>
</table>

a. How much will the home market firms produce and what will be the total demand for the good if the world price of the product is $30?
b. What is the amount imported by the home market under free trade?
c. What is the net loss in the world market if a tariff of $10 is imposed by the home country?
d. What is the loss of consumer surplus in the home country?
e. What is the terms-of-trade gain and what is the deadweight loss?

23. The demand and supply for Gloves is given in the following table:

<table>
<thead>
<tr>
<th>Price</th>
<th>$1</th>
<th>$2</th>
<th>$3</th>
<th>$4</th>
<th>$5</th>
<th>$6</th>
<th>$7</th>
<th>$8</th>
<th>$9</th>
<th>$10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity Supplied</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>Quantity Demanded</td>
<td>20</td>
<td>19</td>
<td>18</td>
<td>17</td>
<td>15</td>
<td>14</td>
<td>13</td>
<td>12</td>
<td>11</td>
<td>10</td>
</tr>
</tbody>
</table>

a. The United States can also import gloves from China at $4 per pair and from Mexico at $5 per pair. Currently, the United States imposes a specific tariff of $2 on its glove imports. Suppose that the United States and Mexico form a free-trade area. How much trade in gloves is created?
b. The United States can also import gloves from China at $4 per pair and from Mexico at $5 per pair. Currently, the United States imposes a specific tariff of $2 on its glove imports. How much trade in gloves is diverted in the U.S.-Mexican free-trade area?
c. The United States can also import gloves from China at $4 per pair and from Mexico at $5 per pair. Currently, the United States imposes a specific tariff of $2 on its glove imports. Is the United States better off or worse off in its trade in gloves following the free-trade agreement with Mexico?
d. The United States can also import gloves from China at $4 per pair and from Mexico at $5 per pair. Currently, the United States imposes a specific tariff of $2 on its glove imports. Suppose instead that the United States negotiated a free-trade agreement with China. Will the United States be better off or worse off as a result of its trade in gloves in the free-trade area with China?
24. The Figure below represents U.S. Imports from Mexico and Asia.

![Graph](image)

a. The figure illustrates a customs union between the United States and Mexico. Under free trade how much of the good will the United States will import from which country at what price?
b. What will total imports be if the United States imposes a tariff of $100?
c. With the $100 tariff, how much will the United States will import from Mexico and from Asia?
d. The $100 tariff by the United States results in how much tariff revenue?
e. If the United States forms a customs union with Mexico, will it result in an increase or a decrease in producer surplus for Mexico and how large will it be?
f. The combined welfare of the United States and Mexico will be higher or lower by what amount?

25. Suppose that the U.S. government required U.S. firms to pay a “living wage” to workers in its subsidiaries or contracting firms in developing countries.

a. What are the likely consequences of this requirement?
b. How would one determine a living wage?

26. Why does immigration lead to a fall in wages when holding the amount of capital and land fixed in both industries, as in the specific-factors model?

27. As wages fall due to immigration, what happens to the marginal products of the specific factors (capital and land) and their rentals?

28. In a long-run model with two goods and two factors, both of which are perfectly mobile between the industries, what happens to the additional labor from immigration?

29. According to the Rybczynski theorem, what will immigration lead to in the two industries (labor intensive and capital-intensive)?

30. Describe NAFTA, the gains and losses for each member.

31. Identify different economic ways that countries interact with one another.

32. According to the Rybczynski theorem, what will FDI lead to?

33. Describe the assumptions of monopolistic competition model and the long-run equilibrium.

34. When trade opens between two countries, what happens to the demand curve faced by each firm?
35. Introducing international trade under monopolistic competition leads to additional gains from trade for what reasons?
36. What does the gravity equation state?
37. What is the provision of a service or the production of various parts of a good in different countries for assembly into a final good in another location called?
38. Why are there gains from offshoring?
39. Rising productivity in India could lead to a fall in the price of R&D in the United States. How does this effect the terms-of trade in the United States.
40. What is an import tariff and list its effects?
41. What is the acronym and name of international trade organization that was formed in 1947, and what is its acronym and name now?
42. What is the “optimal tariff” for a small country and for a large country?
43. What is an import quota and list its effects?
44. Contrast and compare tariffs and import quotas.
45. In the value-chain of activities, describe the activities are offshored?
46. Why would you expect firms with high research and development costs to be more interested in free trade?
47. China has 1,000 units of capital and 3,000 workers; (2) the United States has 3,000 units of capital and 1,000 workers; (3) clothing production is labor intensive; and (4) chemical production is capital intensive. Suppose that the United States eliminates all restrictions on immigration and Chinese workers are free to emigrate from China to the United States. How many Chinese workers must emigrate from China to the United States in order for factor price equalization to occur?
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   b. Will it earn monopoly profits at this equilibrium?
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<td>701.3</td>
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</tr>
</tbody>
</table>

   a. What is the intra-industry trade index for large passenger aircraft?
   b. What is the intra-industry trade index for fax machines?
   c. Which industry has the lowest intra-industry trade index?
50. In Chapter 6 in the textbook, problem number 6 that we did in class.
51. Use Figure 1 to answer

Figure 1: With and Without Offshoring

![Figure 1: With and Without Offshoring](image)

a. Can the combination of output shown by the isoquant, $Y_1$, be achieved and if so, how?
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d. What will happen to the relationship of R&D and components if the world price of components falls?
e. If the price of R&D decreases, what is likely to happen in the home country?

52. In Chapter 7 in the textbook, problem number 1 that we did in class.
53. In Chapter 8 in the textbook, in Figure 8-5, let $P_W$ be $8$, $P_W^t$ be $11$, $D_1=13$, $D_2=11$, $S_1=5$ and $S_2=7$.
   a. How much is the tariff in the home market?
   b. Under free trade, how many units will the home market import?
   c. After the imposition of the tariff, what is the increase in producer surplus in the home market?
   d. What is the government revenue due to the tariff in the home market?
   e. What is the deadweight loss in the home market?

54. In Chapter 9 in the textbook, problem number 8.
55. In Chapter 10 in the textbook, problem number 3.
56. In Chapter 11 in the textbook, problem number 8.
57. Suppose there is only one technique that can be used in clothing production. To produce a unit of clothing requires four labor-hours and one unit of capital; in food production each unit requires a single labor-hour and one unit of capital. At an initial equilibrium suppose the wage rate and capital rental are each valued at two dollars. If both goods are produced, what must be their prices? Now keep the price of food constant and raise the price of clothing to 15 dollars. Trace through the effects on the distribution of income. Rank the relative changes in the wage rate, the price of clothing, the price of food (unchanged), and the rent on capital. Relate your results to the Stopler-Samuelson theorem.

58. According to an article that appeared in the New York Times, China has encouraged the growth of tea exports as one way to help the rural poor and decrease inequality. We can describe what is happening in China using the Specific Factors Model. Assume that there are two goods, tea and computers. Assume that there are two specific factors in China, unskilled labor (which is specific to tea production) and skilled labor (which is specific to computer production). Assume that capital is the mobile factor.
   a. Show what happens to skilled and unskilled nominal as well as real wages if the price of tea rises. Assume that there has been no change in the price of computers.
   b. If the price of tea rises, show what happens to the real return to capital in China.
   c. If you are told that owners of capital use computers but refuse to drink tea, how does this affect your answer?