INTERTEMPORAL TRADE

1-4 With intertemporal trade, the United States and China have identical ratios of current to future consumption, while the ratio of current to future production is higher in China than in the United States.

1. Prior to intertemporal trade, the interest rate in the United States must be _______ than in China.
   a) higher
   b) higher or the same
   c) the same
   d) lower or the same
   e) lower

2. Intertemporal trade causes the interest rate in the United States to
   a) rise
   b) rise or remain unchanged
   c) remain unchanged
   d) fall or remain unchanged
   e) fall

3. Intertemporal trade causes the interest rate in China to
   a) rise
   b) rise or remain unchanged
   c) remain unchanged
   d) fall or remain unchanged
   e) fall

4. Who gains due to intertemporal trade?
   a) China
   b) the United States
   c) both countries
   d) neither country
   e) only lenders in the United States and borrowers in China
MIGRATION

5-8 The United States and Mexico produce oats using labor and land and share the same technology. Initially, the U.S. ratio of labor to land is lower in than in Mexico. Consider the effects of allowing labor to move freely between the two countries, with no barriers to migration.

5. Before migration occurs, how must the real wage in the United States compare to that in Mexico?
   a) higher in the United States
   b) higher in the United States or the same as in Mexico
   c) the same as in Mexico
   d) lower in the United States or the same as in Mexico
   e) lower in the United States

6. After migration occurs, how will the real wage in the United States compare to that in Mexico?
   a) higher in the United States
   b) higher in the United States or the same as in Mexico
   c) the same as in Mexico
   d) lower in the United States or the same as in Mexico
   e) lower in the United States

7. How does allowing immigration affect the marginal product of labor in the United States?
   a) rises
   b) rises or remains unchanged
   c) remains unchanged
   d) falls or remains unchanged
   e) falls

8. How does allowing immigration affect the ratio of labor to land in the United States?
   a) rises
   b) rises or remains unchanged
   c) remains unchanged
   d) falls or remains unchanged
   e) falls
TRADE POLICIES

9-12 The United States removes a binding quota on imports of textiles.

9. The quantity demanded of textiles in the United States
   a) rises due to the US price of textiles rising
   b) rises due to the US price of textiles falling
   c) remains the same
   d) falls due to the US price of textiles rising
   e) falls due to the US price of textiles falling

10. Consumer surplus in the United States
    a) rises due to the US price of textiles rising
    b) rises due to the US price of textiles falling
    c) remains the same
    d) falls due to the US price of textiles rising
    e) falls due to the US price of textiles falling

11. The quantity supplied of textiles in the United States
    a) rises due to the US price of textiles rising
    b) rises due to the US price of textiles falling
    c) remains the same
    d) falls due to the US price of textiles rising
    e) falls due to the US price of textiles falling

12. Producer surplus in the United States
    a) rises due to the US price of textiles rising
    b) rises due to the US price of textiles falling
    c) remains the same
    d) falls due to the US price of textiles rising
    e) falls due to the US price of textiles falling
13-16 Haiti, a small country, *removes* a specific tariff on imports of rice.

13. The quantity demanded of rice in Haiti
   a) rises due to the price of rice in Haiti rising
   b) rises due to the price of rice in Haiti falling
   c) remains the same
   d) falls due to the price of rice in Haiti rising
   e) falls due to the price of rice in Haiti falling

14. The quantity supplied of rice in Haiti
   a) rises due to the price of rice in Haiti rising
   b) rises due to the price of rice in Haiti falling
   c) remains the same
   d) falls due to the price of rice in Haiti rising
   e) falls due to the price of rice in Haiti falling

15. Welfare in Haiti rises because removing the tariff eliminates
   a) consumption distortion from the tariff
   b) production distortion from the tariff
   c) both a) and b)
   d) consumer surplus
   e) producer surplus

16. Which area is the largest in magnitude? How much
   a) producer surplus falls
   b) consumer surplus rises
   c) government revenue lost
   d) producer surplus falls plus how much government revenue lost
   e) cannot tell from the information provided
TRADE POLICY PROBLEMS

In the United States (US), inverse demand for tires is \( P = 76 - 2Q_D \), while inverse supply is \( P = 40 + 2Q_S \). In the rest of the world (ROW), inverse demand for tires is \( P^* = 54 - 2Q_{D^*} \), while inverse supply is \( P^* = 30 + 2Q_{S^*} \).

1. Derive the US autarky price and quantity.

   Derive the US import demand (including slope-intercept form).

   Derive the ROW autarky price and quantity.

   Derive the ROW export supply (including slope-intercept form).
2. Derive the free trade price and US imports under free trade.

Derive US quantity demanded and quantity supplied under free trade.

3. Derive the US tariff-ridden import demand for a specific tariff \( t = 8 \) (including slope-intercept form).

Derive the ROW price, the US price, and US imports with the tariff.

Derive US quantity demanded and quantity supplied with the tariff.

How large of a tariff would the United States need to impose to prohibit all imports?
4. Derive the change in consumer surplus, producer surplus, and government revenue in the United States due to the tariff (starting with the general equations and being sure to indicate the areas corresponding to each on the US graph).

5. Define and derive the US consumption distortion and production distortion.

Define and derive the US efficiency loss and terms of trade gain.

6. Derive the change in welfare in the United States due to the tariff. Confirm that the net welfare calculation yields the same answer.

Is the United States better or worse off with the tariff and why?
DRAW WORLD MARKET GRAPH HERE: US IMPORT DEMAND, ROW EXPORT SUPPLY, US TARIFF-RIDDEN IMPORT DEMAND

DRAW US MARKET GRAPH HERE: US DEMAND, US SUPPLY
Indicate free trade price, US quantity demanded and quantity supplied under free trade, US tariff-ridden price, US quantity demanded and quantity supplied with the tariff, and ROW tariff-ridden price. Label areas corresponding to change in consumer surplus, change in producer surplus, change in government revenue, production distortion, consumption distortion, efficiency loss, and terms of trade gain.

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

Signature __________________________
1a Prior to intertemporal trade, the interest rate in the United States must be higher than in China.

2e Intertemporal trade causes the interest rate in the United States to fall.

3a Intertemporal trade causes the interest rate in China to rise.

4c Both countries gain from intertemporal trade.

5a Before migration, the real wage will be higher in the United States than in Mexico.

6c After migration, the real wage is the same in the United States as in Mexico.

7e Immigration causes the marginal product of labor in the United States to fall.

8a Immigration causes the ratio of labor to land in the United States to rise.

9b The quantity demanded of textiles in the United States rises due to the US price of textiles falling.

10b Consumer surplus in the United States rises due to the US price of textiles falling.

11e The quantity supplied of textiles in the United States falls due to the US price of textiles falling.

12e Producer surplus in the United States falls due to the US price of textiles falling.

13b The quantity demanded of rice in Haiti rises due to the price of rice in Haiti falling.

14e The quantity supplied of rice in Haiti falls due to the price of rice in Haiti falling.

15c Welfare in Haiti rises because removing the tariff eliminates both the consumption and production distortions from the tariff.

16b How much consumer surplus rises is the largest area in magnitude.
1. Derive US autarky price and quantity.

\[ 76 - 2Q^A = 40 + 2Q^A, \ 4Q^A = 36, \ Q^A = 9 \]

\[ P^A = 76 - 2Q^A = 76 - 18 = 58 \]

Derive the US import demand (including slope-intercept form).

\[ P = 76 - 2Q_D, \ Q_D = 38 - \frac{1}{2}P \]

\[ P = 40 + 2Q_S, \ Q_S = -20 + \frac{1}{2}P \]

\[ M = Q_D - Q_S = 38 - \frac{1}{2}P - \left( -20 + \frac{1}{2}P \right) \]

\[ M = 58 - P, \ P = 58 - Q_M \]

Derive the ROW autarky price and quantity.

\[ 54 - 2Q^{A*} = 30 + 2Q^{A*}, \ 4Q^{A*} = 24, \ Q^{A*} = 6 \]

\[ P^{A*} = 54 - 2Q^{A*} = 54 - 12 = 42 \]

Derive the ROW export supply (including slope-intercept form).

\[ P^* = 30 + 2Q^*_S, \ Q^*_S = -15 + \frac{1}{2}P^* \]

\[ P^* = 54 - 2Q^*_D, \ Q^*_D = 27 - \frac{1}{2}P^* \]

\[ X^* = Q^*_S - Q^*_D = -15 + \frac{1}{2}P^* - \left( 27 - \frac{1}{2}P^* \right) \]

\[ X^* = -42 + P^*, \ P^* = 42 + Q^*_X \]
2. Derive the free trade price and US imports under free trade.

\[ M = X^*, \ 58 - P = -42 + P^* \Rightarrow 100 = 2P, \ P = P^* = 50 \]

\[ M = 58 - P = 58 - 50 = 8 \]

Derive US quantity demanded and quantity supplied under free trade.

\[ P = 76 - 2Q_D, \ 50 = 76 - 2Q_D, \ D^1 = Q_D = 13 \]

\[ P = 40 + 2Q_S, \ 50 = 40 + 2Q_S, \ S^1 = Q_S = 5 \]

3. Derive the US tariff-ridden import demand for a specific tariff \( t = 8 \) (including slope-intercept form).

\[ M_T = 58 - P_T = 58 - (P_T^* + 8) \quad M_T = 50 - P_T^*, \ P_T^* = 50 - Q_{M_T} \]

Derive the ROW price, the US price, and US imports with the tariff.

\[ M_T = X^*, \ 50 - P_T^* = -42 + P_T^* \Rightarrow 92 = 2P_T^*, \ P_T^* = 46 \]

\[ P_T = P_T^* + t = 46 + 8 = 54 \]

\[ M_T = 50 - P_T^* = 50 - 46 = 4 \]

Derive US quantity demanded and quantity supplied with the tariff.

\[ P_T = 76 - 2Q_D, \ 54 = 76 - 2Q_D, \ D^2 = Q_D = 11 \]

\[ P_T = 40 + 2Q_S, \ 54 = 40 + 2Q_S, \ S^2 = Q_S = 7 \]

How large of a tariff would the United States need to impose to prohibit all imports?

\[ t' = P^A - P^{A*} = 58 - 42 = 16 \]
4. Derive the change in consumer surplus, producer surplus, and government revenue in the United States due to the tariff.

\[ \Delta CS = -abcd = -(P_T - P)\left( \frac{D^1 + D^2}{2} \right) = -(54 - 50)\left( \frac{13 + 11}{2} \right) = -48 \]

\[ \Delta PS = a = (P_T - P)\left( \frac{S^1 + S^2}{2} \right) = (54 - 50)\left( \frac{5 + 7}{2} \right) = 24 \]

\[ \Delta GR = c\theta = tM_T = 8(4) = 32 \]

5. Define and derive the US consumption distortion and production distortion.

Consumption distortion is loss due to too little consumption.

\[ d = \Delta P \left( \frac{\Delta D}{2} \right) = (54 - 50)\left( \frac{13 - 11}{2} \right) = 4 \]

Production distortion is loss due to too much production.

\[ b = \Delta P \left( \frac{\Delta S}{2} \right) = (54 - 50)\left( \frac{7 - 5}{2} \right) = 4 \]

Define and derive the US efficiency loss and terms of trade gain.

Efficiency loss is size of total distortion, consumption plus production.

\[ b + d = 4 + 4 = 8 \]

Terms of trade gain is degree that buy imports cheaper.

\[ \theta = \left( P - P^{T_A} \right) M_T = (50 - 46)(4) = 16 \]

6. Derive the change in welfare in the United States due to the tariff.

Confirm that the net welfare calculation yields the same answer.

\[ \Delta W = \Delta CS + \Delta PS + \Delta GR = -48 + 24 + 32 = 8 \]

\[ e^{-(b+d)} = 16 - 8 = 8 \]

Is the United States is better or worse off due to the tariff and why?

Better. The terms of trade gain outweighs the efficiency loss for large country adopting a small tariff starting from free trade.

US MARKET GRAPH: US DEMAND, US SUPPLY