STANDARD TRADE MODEL

1-4 Free trade prevails between Canada and the ROW. Suppose Canada experiences economic growth, while the ROW has no growth. Canada exports furniture and imports rugs from the ROW.

1. In world markets, the relative supply of furniture to rugs:
   a) rises
   b) falls
   c) stays the same
   d) rises, if Canada’s growth is biased toward furniture
   e) falls, if Canada’s growth is biased toward furniture

2. In world markets, the relative price of furniture to rugs:
   a) rises
   b) falls
   c) stays the same
   d) rises, if Canada’s growth is biased toward furniture
   e) falls, if Canada’s growth is biased toward furniture

3. The secondary effect of the economic growth on Canada is a terms of trade:
   a) improvement
   b) deterioration
   c) unchanged
   d) improvement, if Canada’s growth is biased toward furniture
   e) deterioration, if Canada’s growth is biased toward furniture

4. The secondary effect of Canada’s growth on the ROW is a terms of trade:
   a) improvement
   b) deterioration
   c) unchanged
   d) improvement, if Canada’s growth is biased toward furniture
   e) deterioration, if Canada’s growth is biased toward furniture
5-8 Suppose the United States currently borrows from the ROW.

5. Which of the following is NOT true?
   a) The ROW currently consumes less than it produces in value.
   b) The United States currently consumes more than it produces in value.
   c) The ROW will be able to consume more than produces in value sometime in the future.
   d) The United States must produce more than consumes in value sometime in the future.
   e) No country can import more than export in the current period

6. In an intertemporal budget constraint, $1 + r$ represents the
   a) relative price of current to future, $P_C / P_F$
   b) relative price of future to current, $P_F / P_C$
   c) price of current consumption and production, $P_C$
   d) price of future consumption and production, $P_F$
   e) autarky level of consumption and production

7. This pattern of intertemporal trade could stem from the United States, at the same interest rate:
   a) consuming more current to future than the ROW
   b) consuming less current to future than the ROW
   c) producing more current to future than the ROW
   d) producing less current to future than the ROW
   e) a) and d)

8. If the real interest rate increases while under intertemporal trade, who gains and loses?
   a) United States and ROW gain; none lose
   b) United States gains and ROW loses
   c) ROW gains and United States loses
   d) United States and ROW lose; none gain
   e) Cannot determine based on the information provided
TRADE POLICIES

9-12 Suppose the United States removes its binding quota on imports of sugar.

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

10. The quantity supplied of sugar and producer surplus in the United States
    a) rises due to the US price of sugar rising
    b) rises due to the US price of sugar falling
    c) remains the same
    d) falls due to the US price of sugar rising
    e) falls due to the US price of sugar falling

11. What would change if the United States replaced the import quota with an import tariff that kept the U.S. price of sugar the same as with the quota?
    a) consumer surplus would be lower with the tariff than the quota
    b) consumer surplus would be higher with the tariff than the quota
    c) producer surplus would be lower with the tariff than the quota
    d) producer surplus would be higher with the tariff than the quota
    e) U.S. government would collect tariff revenue

12. Considering policies that yield the same domestic price, which type of trade restriction is most likely to generate foreign retaliation?
    a) an import quota where give the quota rights away for free
    b) an import quota where auction off the quota rights
    c) an import tariff
    d) a or b
    e) b or c
13-16 Suppose Switzerland adopts an export subsidy on dairy products. Switzerland is large enough to affect world prices for dairy products.

13. The price of dairy products in Switzerland will ____ due to adopting the export subsidy.
   a) rise by the full amount of the subsidy  
   b) rise by less than the full amount of the subsidy  
   c) fall by the full amount of the subsidy  
   d) fall by less than the full amount of the subsidy  
   e) remain unchanged

14. The price of dairy products in the rest of the world will ____ due to Switzerland adopting an export subsidy.
   a) rise by the full amount of the subsidy  
   b) rise by less than the full amount of the subsidy  
   c) fall by the full amount of the subsidy  
   d) fall by less than the full amount of the subsidy  
   e) remain unchanged

15. The export subsidy creates consumption distortions that cause Switzerland to consume ________ dairy products and production distortions that cause Switzerland to produce ________ dairy products.
   a) too much, too much  
   b) too much, too little  
   c) too little, too much  
   d) too little, too little  
   e) the right amount of, the right amount of

16. Taking into account the effects on consumer surplus, producer surplus, and government revenue in Switzerland, overall welfare in Switzerland will ____ when Switzerland adopts the export subsidy on dairy products.
   a) rise  
   b) fall  
   c) remain unchanged  
   d) rise or remain unchanged  
   e) fall or remain unchanged
TRADE POLICY PROBLEMS

In the United States (US), inverse demand is $P = 28 - 2Q_D$, while inverse supply is $P = 12 + 2Q_S$. In the rest of the world (ROW), inverse demand is $P^* = 20 - 2Q_{D^*}$, while inverse supply is $P^* = 4 + 2Q_{S^*}$

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 \( t = 4 \) (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 __________________________
MULTIPLE CHOICE

1d  In world markets, the relative supply of furniture to rugs rises if Canada’s growth is biased toward furniture.

2e  In world markets, the relative price of furniture to rugs falls if Canada’s growth is biased toward furniture.

3e  The secondary effect of the economic growth on Canada is a terms of trade deterioration, if Canada’s growth is biased toward furniture.

4d  The secondary effect of Canada’s growth on the ROW is a terms of trade improvement, if Canada’s growth is biased toward furniture.

5e  A country can import more than export in the current period.

6a  $1 + r$ represents the relative price of current to future, $P_C / P_F$.

7e  This pattern of intertemporal trade could stem from the US at the same interest rate: a) consuming more current to future than the ROW and d) producing less current to future than the ROW.

8c  If the real interest rate increases, ROW gains and US loses.

9b  The quantity demanded of sugar and consumer surplus in the United States rises due to the US price of sugar falling.

10e  The quantity supplied of sugar and producer surplus in the United States falls due to the US price of sugar falling.

11e  U.S. government would collect tariff revenue.

12e  An import quota where auction off the quota rights or an import tariff.

13b  The price of dairy products in Switzerland will rise by less than the full amount of the subsidy due to adopting the export subsidy.

14d  The price of dairy products in the rest of the world will fall by less than the full amount of the subsidy due to Switzerland adopting an export subsidy.

15c  The export subsidy creates consumption distortions that cause Switzerland to consume too little dairy products and production distortions that cause Switzerland to produce too much dairy products.

16b  Taking into account the effects on consumer surplus, producer surplus, and government revenue in Switzerland, overall welfare in Switzerland will fall when Switzerland adopts the export subsidy on dairy products.
TRADE POLICY PROBLEMS

1 Derive US autarky price and quantity.

\[ 28 - 2 Q^A = 12 + 2 Q^A, \quad 4 Q^A = 16, \quad Q^A = 4 \]

\[ P^A = 28 - 2 Q^A = 28 - 8 = 20 \]

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

\[ P = 28 - 2 Q_D, \quad Q_D = 14 - \frac{1}{2} P \]

\[ P = 12 + 2 Q_S, \quad Q_S = -6 + \frac{1}{2} P \]

\[ M = Q_D - Q_S = 14 - \frac{1}{2} P - \left( -6 + \frac{1}{2} P \right) \]

\[ M = 20 - P, \quad P = 20 - Q_M \]

Derive the ROW autarky price and quantity.

\[ 20 - 2 Q^{A*} = 4 + 2 Q^{A*}, \quad 4 Q^{A*} = 16, \quad Q^{A*} = 4 \]

\[ P^{A*} = 20 - 2 Q^{A*} = 20 - 8 = 12 \]

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

\[ P^* = 4 + 2 Q_S^*, \quad Q_S^* = -2 + \frac{1}{2} P^* \]

\[ P^* = 20 - 2 Q_D^*, \quad Q_D^* = 10 - \frac{1}{2} P^* \]

\[ X^* = Q_S^* - Q_D^* = -2 + \frac{1}{2} P^* - \left( 10 - \frac{1}{2} P^* \right) \]

\[ X^* = -12 + P^*, \quad P^* = 12 + Q_X^* \]
2. Derive the free trade price and US imports under free trade.
\[ M = X^*, \ 20 - P = -12 + P^*, \ 32 = 2P, \ P = P^* = 16 \]
\[ M = 20 - P = 20 - 16 = 4 \]

Derive US quantity demanded and quantity supplied under free trade.
\[ P = 28 - 2Q_D, \ 16 = 28 - 2Q_D, \ D^1 = Q_D = 6 \]
\[ P = 12 + 2Q_S, \ 16 = 12 + 2Q_S, \ S^1 = Q_S = 2 \]

3. Derive the US tariff-ridden import demand for a specific tariff \( t = 4 \) (including slope-intercept form).
\[ M_T = 20 - P_T = 20 - (P_T^* + 4) \]
\[ M_T = 16 - P_T^*, \ P_T^* = 16 - Q_{M_T} \]

Derive the ROW price, the US price, and US imports with the tariff.
\[ M_T = X^*, \ 16 - P_T^* = -12 + P_T^*, \ 28 = 2P_T^*, \ P_T^* = 14 \]
\[ P_T = P_T^* + t = 14 + 4 = 18 \]
\[ M_T = 16 - P_T^* = 16 - 14 = 2 \]

Derive US quantity demanded and quantity supplied with the tariff.
\[ P_T = 28 - 2Q_D^T, \ 18 = 28 - 2Q_D^T, \ D^2 = Q_D^T = 5 \]
\[ P_T = 12 + 2Q_S^T, \ 18 = 12 + 2Q_S^T, \ S^2 = Q_S^T = 3 \]

How large of a tariff would the United States need to impose to prohibit all imports?
\[ t' = P^A - P^{A*} = 20 - 12 = 8 \]
4. Derive the change in consumer surplus, producer surplus, and government revenue in the United States due to the tariff.

\[ \Delta CS = -abcd = (P_T - P) \left( \frac{D^1 + D^2}{2} \right) = -(18 - 16) \left( \frac{6 + 5}{2} \right) = -11 \]

\[ \Delta PS = a = (P_T - P) \left( \frac{S^1 + S^2}{2} \right) = (18 - 16) \left( \frac{2 + 3}{2} \right) = 5 \]

\[ \Delta GR = ce = tM_T = 4 \cdot 2 = 8 \]

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

*Consumption distortion is loss due to too little consumption.*

\[ d = \Delta P \left( \frac{\Delta D}{2} \right) = (18 - 16) \left( \frac{6 - 5}{2} \right) = 1 \]

*Production distortion is loss due to too much production.*

\[ b = \Delta P \left( \frac{\Delta S}{2} \right) = (18 - 16) \left( \frac{3 - 2}{2} \right) = 1 \]

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

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

\[ b + d = 1 + 1 = 2 \]

*Terms of trade gain is degree that buy imports cheaper.*

\[ e = (P - P^*) M_T = (16 - 14) \cdot 2 = 4 \]

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

\[ \Delta W = \Delta CS + \Delta PS + \Delta GR = -11 + 5 + 8 = 2 \]

\[ e-(b+d) = 4 - 2 = 2 \]

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