Question 3

5 points (1 + 3 + 1)

(a) 1 point:
   • One point is earned for stating that Loriland is importing 12 million pounds.

(b) 3 points:
   • One point is earned for identifying the new level of domestic production as 6 million pounds.
   • One point is earned for calculating the domestic consumer surplus as $25 million and showing the work: \( \frac{1}{2} \left( \$(9 - \$4) \times 10 \right) = \$25 \)
   • One point is earned for calculating the revenue from the tariff as $8 million and showing the work: \( (\$4 - \$2) (10 - 6) = \$8 \).

(c) 1 point:
   • One point is earned for identifying the per-unit tariff that maximizes the sum of consumer and producer surplus as $0.
3. Sugar is freely traded in the world market. Assume that a country, Loriland, is a price taker in the world market for sugar. Some of the sugar consumed in Loriland is produced domestically while the rest is imported. The world price of sugar is $2 per pound. The graph below shows Loriland’s sugar market, and 

\[ P_W \] 

represents the world price.

\[ \begin{align*}
\text{PRICE} \\
\text{\$2} & \quad \text{\$4} & \quad \text{\$6} & \quad \text{\$8} & \quad \text{\$10} & \quad \text{\$12} \\
0 & \quad 2 & \quad 4 & \quad 6 & \quad 8 & \quad 10 & \quad 12 & \quad 14 \\
\text{DOMESTIC SUPPLY} \\
\text{DOMESTIC DEMAND} \\
\text{MILLIONS OF POUNDS} \\
\end{align*} \]

(a) At the world price of $2 per pound, how much sugar is Loriland importing?

(b) Suppose that Loriland imposes a per-unit tariff on sugar imports and the new domestic price including the tariff is $4.

(i) Identify the new level of domestic production.

(ii) Calculate the domestic consumer surplus for Loriland. You must show your work.

(iii) Calculate the total tariff revenue collected by the government. You must show your work.

(c) Given the world price of $2, what per-unit tariff maximizes the sum of Loriland’s domestic consumer surplus and producer surplus?

\[ a) \text{ At } \$2 \text{ per pound, the quantity of domestic demand is } 14 \text{ million pounds, but domestic supply quantity supplied is } 2. \]

\[ 14 - 2 = 12 \]

\[ \text{\$} 12 \text{ million pounds of sugar are imported into Loriland.} \]

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b) i) At $4, the domestic quantity supplied is 6 million pounds.

ii) Consumer surplus is the triangle between $8, $9, and the quantity demanded. $A = \frac{bh}{2}$

\[ b = 10, \ h = 5, \ \frac{5 \times 10}{2} = \$25. \text{ Consumer surplus is } \$25. \]

iii) At $4, the domestic quantity demanded exceeds domestic supply by 4 million pounds.

The tariff is $2 per pound ($4 - $2 = $2)

\[ $2 \times 4,000,000 	ext{ lbs} = 8,000,000 \]

Tariff revenue is equal to $8 million.

c) To maximize surplus, no tariff should be imposed. Tariffs increase domestic producer surplus, but decrease consumer surplus by far more and create deadweight loss.

To maximize surplus, Loriland should impose a tariff of $0.00 per unit.
3. Sugar is freely traded in the world market. Assume that a country, Loriland, is a price taker in the world market for sugar. Some of the sugar consumed in Loriland is produced domestically while the rest is imported. The world price of sugar is $2 per pound. The graph below shows Loriland’s sugar market, and $P_w$ represents the world price.

![Graph showing domestic supply and demand for sugar in Loriland.]

(a) At the world price of $2 per pound, how much sugar is Loriland importing?

(b) Suppose that Loriland imposes a per-unit tariff on sugar imports and the new domestic price including the tariff is $4.

   (i) Identify the new level of domestic production.

   (ii) Calculate the domestic consumer surplus for Loriland. You must show your work.

   (iii) Calculate the total tariff revenue collected by the government. You must show your work.

(c) Given the world price of $2, what per-unit tariff maximizes the sum of Loriland’s domestic consumer surplus and producer surplus?

   a) 12 million pounds

   b) i. 6 million pounds

   ii. $A = \frac{3(6)}{2} = 9$

   B: $2(6) = 12$

   TAB $\$21$

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Additional answer page for Question 3.

\[ 4(2) = \$8 \]

\[ \text{c) } \$3 \text{ per unit} \]
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(ii) Calculate the domestic consumer surplus for Loriland. You must show your work.

(iii) Calculate the total tariff revenue collected by the government. You must show your work.

(c) Given the world price of $2, what per-unit tariff maximizes the sum of Loriland’s domestic consumer surplus and producer surplus?

\[
\begin{align*}
(a) & \text{2 million pounds} \\
(b) & \text{6 million pounds} \\
\quad \text{ii) } & 6 \times 0 = 36,000,000 \\
\quad \text{iii) } & 4 \times 0 = 24,000,000 \\
(c) & \text{3 tariff}
\end{align*}
\]
Overview

This question tested for proficiency with a supply-and-demand model involving trade. Students were asked to identify the quantity of imports without a tariff and domestic production with a tariff. They were also asked to calculate consumer surplus and tariff revenue, and to indicate that the sum of consumer and producer surplus is maximized when the tariff is zero.

Sample: 3A
Score: 5

The student answers all parts of the question correctly and so earned all 5 points.

Sample: 3B
Score: 3

The student lost 1 point in part (b)(ii) for the incorrect calculation of domestic consumer surplus, and 1 point in part (c) for stating an incorrect per-unit tariff.

Sample: 3C
Score: 1

The student earned 1 point in part (b)(i) for correctly identifying of the level of domestic production.