

Please write your answers neatly and legibly.

1. Consider the market for bicycles in Zeeland, a small, closed economy. The market for bicycles in Zeeland can be described by the following demand and supply curves where P is the price per bicycle and Q is the quantity of bicycles:

Domestic Demand for Bicycles: $P = 500 - 5Q$

Domestic Supply of Bicycles: $P = 100 + 15Q$

- a. (1 point) Determine the equilibrium price and quantity for bicycles in Zeeland given the above information. Show your work for full credit and put your answers in the provided spaces.

Equilibrium Price = _____

Equilibrium Quantity = _____

Answer:

To find the equilibrium price and quantity set the demand equation equal to the supply equation:

$$500 - 5Q = 100 + 15Q$$

$$400 = 20Q$$

$$Q = 20 \text{ bicycles}$$

Plug this quantity into either the demand equation or the supply equation to find the equilibrium price:

$$P = 500 - 5Q = 500 - 5(20) = \$400 \text{ per bicycle}$$

$$\text{Or, } P = 100 + 15Q = 100 + 15(20) = \$400 \text{ per bicycle}$$

Equilibrium Price = ___\$400 per bicycle___

Equilibrium Quantity = ___20 bicycles___

- b. (1 point) Calculate the value of consumer surplus (CS) and producer surplus (PS) in the closed market for bicycles in Zeeland. Show your work for full credit and make sure you provide units of measurement in your answer. Put your answers in the provided spaces.

Consumer Surplus = CS = _____

Producer Surplus = PS = _____

Answer:

CS = area under the demand curve and above the price consumers pay. $CS = (1/2)(\$500 \text{ per bicycle} - \$400 \text{ per bicycle})(20 \text{ bicycles}) = \1000

PS = area above the supply curve and beneath the price producers receive. $PS = (1/2)(\$400 \text{ per bicycle} - \$100 \text{ per bicycle})(20 \text{ bicycles}) = \3000

Consumer Surplus = CS = ___\$1000___

Producer Surplus = PS = ___\$3000___

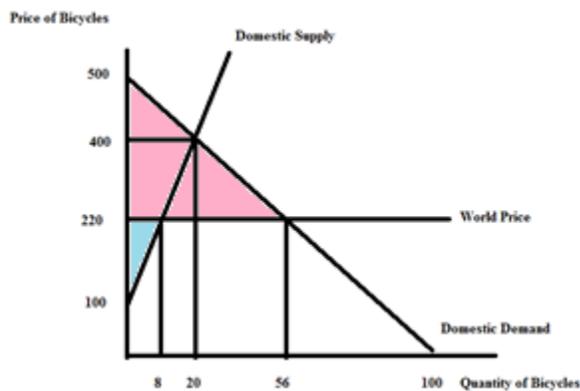
- c. (4 points) Suppose that the world price of bicycles is \$220. Holding everything else constant, if Zeeland opens the bicycle market to trade, what do you predict will happen to the following? Your

answers should be "increase", "decrease", "remains constant", or "cannot be predicted". Provide a well-labeled graph to illustrate your answer: the graph should be completely and thoroughly labeled! Provide your responses in the spaces provided and then draw your graph in the adjacent space. There is NO NEED TO CALCULATE THE NUMERIC VALUES OF CS, PS, AND TS. Do provide a numeric value for imports.

CS with trade _____
 PS with trade _____
 Imports _____
 Total surplus with trade _____

Answer:

Here's the graph, followed by an explanation:



When the market for bicycles opens in Zeeland, domestic consumers will demand 56 bicycles ($P = 500 - 5Q$ and if $P = 220$, then $220 = 500 - 5Q$ or $Q = 56$). When the market for bicycles opens in Zeeland, domestic producers will produce 8 bicycles ($P = 100 + 15Q$ and if $P = 220$, then $220 = 100 + 15Q$ or $Q = 8$). Imports will equal the quantity demanded domestically minus the quantity supplied domestically at a price of \$220. Imports = $56 - 8 = 48$.

No need to make the math calculations for CS, PS, and TS!

CS will increase to be the pink area in the above graph: $CS = (1/2)(500 - 220)(56) = \7840 versus the original \$1000.

PS will decrease to be the blue area in the above graph: $PS = (1/2)(220 - 100)(8) = \480 versus the original \$3000.

TS with trade will increase to the sum of the pink and blue areas: $TS = CS + PS = \$8320$ versus the original \$4000.

CS with trade ____ increases _____
 PS with trade _____ decreases _____
 Imports ____ 48 bicycles _____
 Total surplus with trade ____ increases _____

d. (3 points) Suppose that this market is open to trade with the world price of bicycles being \$220. If the government of Zeeland imposes a tariff of \$90 per bike, what will be the impact on the following?

Compute numeric values for all answers. Show your work for full credit and put your final answers in the provided spaces.

Consumer Surplus with the tariff = _____

Producer Surplus with the tariff = _____

Government Tariff Revenue = _____

Deadweight Loss from the tariff = _____

Deadweight Loss due to using a less efficient producer to produce the good once the tariff is introduced = _____

Deadweight Loss due to pushing consumers away from the level of consumption they wish to have = _____

Answer:

With the tariff, the price of bicycles rises from \$220 to \$310.

With the tariff price of \$310, the quantity demanded domestically is equal to 38 bicycles. To see this, plug the tariff price of \$310 into the demand equation:

$$P = 500 - 5Q$$

$$310 = 500 - 5Q$$

$$5Q = 190$$

$$Q = 38$$

With the tariff price of \$310, the quantity supplied domestically is equal to 14 bicycles. To see this, plug the tariff price of \$310 into the supply equation:

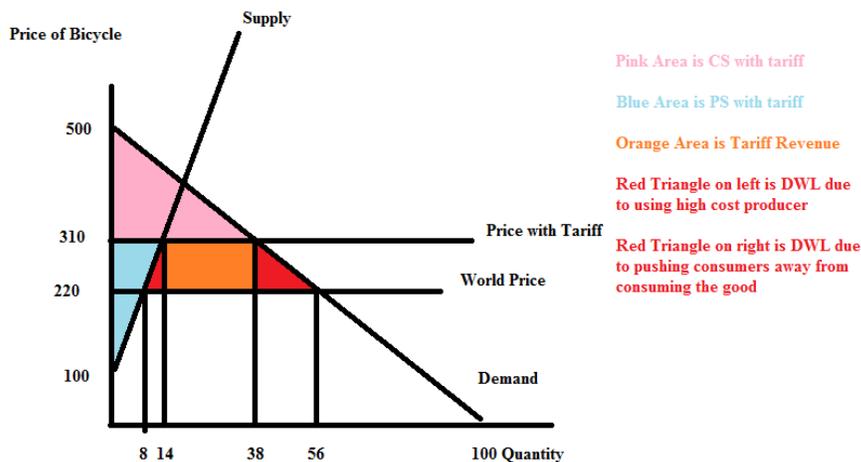
$$P = 100 + 15Q$$

$$310 = 100 + 15Q$$

$$210 = 15Q$$

$$Q = 14$$

A graph will prove helpful for the calculations:



$$CS \text{ with tariff} = (1/2)(500 - 310)(38) = \$3610$$

$$PS \text{ with tariff} = (1/2)(310 - 100)(14) = \$1470$$

$$\text{Government Tariff Revenue} = (310 - 220)(38 - 14) = \$2160$$

$$\text{Deadweight Loss form the tariff} = (1/2)(310 - 220)(14 - 8) + (1/2)(310 - 220)(56 - 38) = \$270 + \$810 = \$1080$$

Deadweight Loss due to using a less efficient producer to produce the good once the tariff is introduced = $(1/2)(310 - 220)(14 - 8) = \270

Deadweight Loss due to pushing consumers away from the level of consumption they wish to have = $(1/2)(310 - 220)(56 - 38) = \810

Consumer Surplus with the tariff = _____ \$3610 _____

Producer Surplus with the tariff = _____ \$1470 _____

Government Tariff Revenue = _____ \$2160 _____

Deadweight Loss from the tariff = _____ \$1080 _____

Deadweight Loss due to using a less efficient producer to produce the good once the tariff is introduced = _____ \$270 _____

Deadweight Loss due to pushing consumers away from the level of consumption they wish to have = _____ \$810 _____

d. (1 point) Suppose that government officials in Zeeland would prefer to implement an import quota rather than a tariff in the market for bicycles. If the intent of the policy is to have an import quota that results in exactly the same outcome as the tariff, what price must the government get the licensed importers to pay per bicycle to the government for the license to import the good? Explain your reasoning.

Answer:

The tariff raised prices from \$220 to \$310. So an equivalent import quota must result in the same price. This means that the government must sell the licenses to import the good at an amount of \$310 - \$220 or \$90 per license to import a bicycle. At this price importers will import 24 bicycles and the government will collect $(\$90 \text{ per bike})(24 \text{ imported bikes})$ or \$2160 in license holder revenue. So, the price the government must sell the licenses for is \$90 per license where a license allows the holder to import a single bicycle.