$$\Delta\tau_i = \frac{x_i - m_i}{\varepsilon * \varphi * m_i}$$

Consider an environment in which the U.S. levies a tariff of rate τ_i on country i and $\Delta\tau_i$ reflect the change in the tariff rate. Let $\varepsilon > 0$ represent the elasticity of imports with respect to import price , let $\varphi > 0$ represent the passthrough from tariffs import price, let $m_i > 0$ represent total import from country i, and $x_i > 0$ represent total export. Then the decrease in import due to a change in tariffs equals $\Delta\tau_i * \varepsilon * \varphi * m_i$.

The malicious aspect of this equation is that it employs Greek letters and represents differences with delta, making it appear unnecessarily complex. As stated in the explanation, this equation is originally a transformation of the following equation:

$$\Delta\tau_i * \varepsilon * \varphi * m_i = x_i - m_i$$

If you take a moment to look at it calmly, the right-hand side represents the total amount (monetary value) that a certain country exports to the United States, minus the amount that the same country imports from the United States. Given the context, this corresponds to the trade deficit of that country with the United States

For those unfamiliar with mathematical notation, the * symbol represents multiplication. Rewriting it using the $\times$ symbol, the equation becomes:

$$\Delta\tau_i \times \varepsilon \times \varphi \times m_i = x_i - m_i$$

As will be explained later, Greek letters such as epsilon (ε) and phi (φ) have been intentionally included to make the equation appear more complex than it actually is. To better understand this deliberate complexity, I will first explain the meanings of ε and φ.

Following the order of explanation, I will rearrange the multiplication sequence on the right-hand side using the commutative property of multiplication:

$$x_i - m_i = \Delta\tau_i \times \varphi \times \varepsilon \times m_i$$

The left-hand side represents the total exports from the United States to a given country minus that country's imports from the United States. In essence, this corresponds to the total trade surplus resulting from trade between that country and the U.S. However, if m_i is greater than x_i, then x_i-m_i < 0, indicating a trade deficit.

Next, regarding the right-hand side of the equation, let's begin by explaining φ. According to the explanation of the equation, φ represents the pass-through rate, which indicates the extent to which a price increase due to tariffs affects the actual price.

For example, if the import cost of product increases 1 dollar due to tariffs, both the exporting and importing companies may hesitate to directly pass the increased cost onto consumers in the form of higher prices, as this could reduce sales. Instead, they may try to absorb the price increase by improving productivit y or lowering profit margins to maintain the same selling price as before. As a result, the entire a dollar price increase caused by the tariff is unlikely to be fully reflected in the final sel ling price.

The pass - through rate measures the degree of this price adjustment. For instance, if a tariff of 1 dollar leads to an actual price increase of only 0.5 dollar , then the pass -through rate is 0.5.

Therefore, the term

$\Delta \tau_i \times \varphi$ on the right - hand side of the equation represents:

Tariff increase $\times$ Degree of price increase due to the tariff

= Price change caused by the tariff.

Next, regarding ε , this represents the price elasticity of imports in relation to import prices. Price elasticity is an economic term that, simply put, describes the percentage decrease in demand when the price of a product increases by 1%. It is expressed mathematically as:

$$\varepsilon = \frac{-(\text{percentage change in demand})}{\text{percentage change in price}}$$

This value ranges from 0 to infinity and depends on both the characteristics of the product and the nature of the consumers. For example, I only drink cheap alcohol. Since I drink alcohol daily, it is essential for me, so even if the price rises slightly, I will still buy a fixed amount of cheap alcohol. In my case, the price elasticity of cheap alcohol is extremely low. On the other hand, someone who drinks expensive alcohol just to show off, despite not even understanding the taste, treats it as a luxury item. If the price of this expensive alcohol rises, they would reduce their consumption. In their case, the price elasticity of alcohol is high.

As seen in this example, price elasticity is influenced by the necessity of the product, the availability of substitute products, and how consumers perceive the product. Using this elasticity formula, the meaning of the term $\Delta \tau_i \times \varphi \times \varepsilon$ on the right - hand side of the equation can be written as:

$$\text{Tariff increase} \times \text{Degree of price increase due to the tariff} \times \frac{-(\text{percentage change in demand})}{\text{percentage change in price}}$$

$$= \text{Degree of price increase due to the tariff} \times \frac{-(\text{percentage change in demand})}{\text{percentage change in price}}$$

= percentage change in demand

which simplifies to:Percentage change in demand due to the tariff

Therefore, the meaning of the entire right - hand side, $\Delta\tau_i \times \varphi \times \varepsilon \times m_i$ is:

Percentage change in demand due to tariffs × Total import volume from country i

= Change in demand caused by tariffs.

In other words, the entire right - hand side represents how much demand decreases when the U.S. increases tariffs by $\Delta\tau_i$

Thus, the equation:

means that the trade deficit is set equal to the reduction in demand caused by tariffs.

Therefore, the equation:

$$x_i - m_i = \Delta\tau_i \times \varphi \times \varepsilon \times m_i$$

provides the answer to the question of how much the U.S. needs to increase its tariff rate in order to eliminate its trade deficit through the imposition of tariffs

The creators of this formula (the U.S. Department of Commerce) explain that it was calculated as the tariff rate necessary to balance the bilateral trade deficit between the United States and each of its trading partners. This explanation is correct.

In other words, if the problem were simply determining the tariff rate needed to make the bilateral trade balance zero for both parties, then this answer might be correct. However, if the question is how to address an imbalance in bilateral trade, respondi ng in this manner would not earn an economics degree. This is because trade imbalances arise from various reasons, and not all of them can be resolved through tariffs.

If applying tariffs were the absolute necessity, then such a formula might be used to calculate the required tariff rate. However, beyond that specific use, this formula holds no other meaning.

To claim that this tariff rate was unfairly imposed on America, one would have to accept the hypothesis that, without it, trade between the United States and the other country would be perfectly balanced, meaning both sides would have $x_i - m_i$=0. But since productivity and purchasing power differ between countries, trade benefits do not necessarily balance at $x_i - m_i = 0$, regardless of whether tariffs are in place. In essence, this formula merely represents a desire to use tariffs to bring trade balances to zero for both parties.

In any case, the value of $\Delta\tau_i$ obtained in this manner cannot be interpreted as the unfair tariff rate imposed by a trading partner on the United States, including non - tariff barriers. Such a mistaken interpretation would likely come

from someone who does not understand multiplication or division — someone lacking even middle school - level mathematics knowledge.

Even distinguished economists have expressed astonishment at this formula and criticized its creators. While I am not an economist, I was surprised when I heard that this formula was claimed to represent the unfair tariff rate causing trade imbalances. Regardless of whether one is an economist or not, anyone with middle school - level mathematics should be able to recognize th at this formula does not indicate an unfair tariff rate.

Japanese media have reported that renowned economists consider this formula incorrect or even absurd, created by individuals lacking fundamental intelligence. However, such statements are disrespectful to eminent economists. Anyone following basic common s ense would immediately recognize the errors in this formula. Therefore, rather than merely presenting the formula, the media should explain its meaning and report on the ignorance of those who claimed it represented "reciprocal tariffs" imposed on each cou ntry.

To obscure this fact, someone — whose identity remains unknown — added symbols like ε and φ to make the formula appear more legitimate. That person must have felt embarrassed.

Japanese media should report as follow.

“ Even this kind of idiot can be President. America is really great country. ”