The Producers
The objective for producers in economic modeling is to maximize profits. This is another example of rational behavior where the agent continues with an activity as long as the marginal benefit of that activity is greater than its marginal cost. What we need to do is define these terms in the context of the producer.

Producers are associated with two verbs: produce and sell. Essentially, producers produce goods and then sell them, and will continue to produce and sell if they continue to gain profit from it.

Relative price is the price of a good in terms of another good. For example, suppose the price of a banana is $0.50/banana and the price of an apple is $1/apple. If we take the ratio of the price of apples divided by the price of bananas, $1/apple/$0.50/banana, we obtain 2 bananas per apple. This is the relative price of apples in terms of bananas. Refering to the graph on the next page, relative price can be portrayed as a negatively sloping line. Movement down along any of the three lines in that diagram represents the giving up of bananas for additional apples. These are called price lines.

In the case of the consumer, the relative price of an apple is the number of bananas the consumer forgoes in the purchase of an apple. The consumer of course pays the producer for the apple. Therefore, the relative price of an apple would be the number of bananas the producer receives from the sale of an apple. Therefore the relative price is the marginal revenue the producer earns from the additional sales of an apple. In this case, instead of earning some form of money, the producer receives Bananas.

The student should recognize that relative price is one half of the producer’s decision of whether it is profitable to produce and sell an apple. In essence, relative price, Pa/Pb, plays the role of marginal benefit for the producer as a rational decision maker.

The slope of the PPF is the marginal rate of transformation (MRT); the cost of an additional unit of the good on the vertical axis in terms of the amount of the good on vertical axis that must be sacrificed. As a result of being on the PPF, in order to produce an additional apple, the producer must necessarily reduce production of bananas. The resources required to produce the additional apple have to be gotten by diverting resources away from their other productive activities. MRT is the marginal cost of producing the additional apple, measured in terms of bananas. As such it place the role of marginal cost for the rational producer.
Profit maximization occurs when the additional revenue earned from the sale of a good is equal to the cost of producing the additional unit of the good. Referring to Graph 1, at point A the slope of the price line is equal to the slope of the PPF. This is equivalent to \( \frac{P_{\text{apples}}}{P_{\text{bananas}}} \times \text{MRT}. \) At this point, profits are maximized.

To be sure that the student understands this, let’s suppose that \( \frac{P_{\text{apples}}}{P_{\text{bananas}}} > \text{MRT} \), for example at point B. The absolute slope of the price line is greater than the tangent (not drawn in) of the PPF at point B. This would say that producers would earn more bananas from the sale of an apple than the number of bananas it would cost them to produce the apple. In this case producers, would profit from the production and sales of the additional apple. They would continue to produce more apples as long as this inequality held. But as they produce more apples, the MRT increases. This would be represented as a shift to the right along the PPF. So as apple production increases (and banana production falls), producers earn more profit. Profit is maximized when there is no longer any gain to profit from switching from banana to apple production.

Take the other perspective and let \( \frac{P_{\text{apples}}}{P_{\text{bananas}}} < \text{MRT} \) at point C in Graph 1. Here, producers’ earnings from the sale of an apple, in terms of bananas are less than its cost. Producers have taken a loss from producing more apples. They would then reduce apple production (increasing banana production instead) which in turn would result in a decrease in MRT. Apple production would continue to fall until relative price equaled MRT. This would be interpreted as a shift to the left along the PPF to the point where profits are maximized.