



■ **Key Equations**

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|---|---|
| <ol style="list-style-type: none"> 1. Utility Maximizing Rule: $MU_A/P_A = MU_B/P_B$ 2. Percent Change = $\frac{\text{New Number} - \text{Old}}{\text{Old Number}} \times 100$ 3. Elasticity Demand/Supply = $\frac{\% \text{ Change Quantity}}{\% \text{ Change in Price}}$ 4. Cross-Price Elasticity = $\frac{\% \text{ Change Quantity}_x}{\% \text{ Change in Price}_y}$ 5. Income Elasticity = $\frac{\% \text{ Change Quantity}}{\% \text{ Change in Income}}$ 6. Consumer Surplus = $\frac{1}{2}(\text{base})(\text{height})$ 7. Marginal Product = $\frac{\text{Change in Total Product}}{\text{Change in Inputs}}$ 8. Marginal Cost = $\frac{\text{Change in Total Cost}}{\text{Change in Output}}$ 9. Total Cost = $\text{Variable Cost} + \text{Fixed Cost}$ | <ol style="list-style-type: none"> 10. Average Total Cost = $\text{Total Cost}/\text{Quantity}$ 11. Average Variable Cost = $\text{Total Variable Cost}/\text{Quantity}$ 12. Average Fixed Cost = $\text{Total Fixed Cost}/\text{Quantity}$ 13. Total Revenue = $(\text{Price})(\text{Quantity})$ 14. Profit = $\text{Total Revenue} - \text{Total Cost}$ 15. Profit Maximizing Rule: $MR = MC$ 16. Least Cost Rule: $MP_L/P_L = MP_C/P_C$ 17. Marginal Revenue Product = $\frac{\text{Change in Revenue}}{\text{Change in Inputs}}$ 18. Marginal Factor Cost = $\frac{\text{Change in Total Cost}}{\text{Change in Inputs}}$ |
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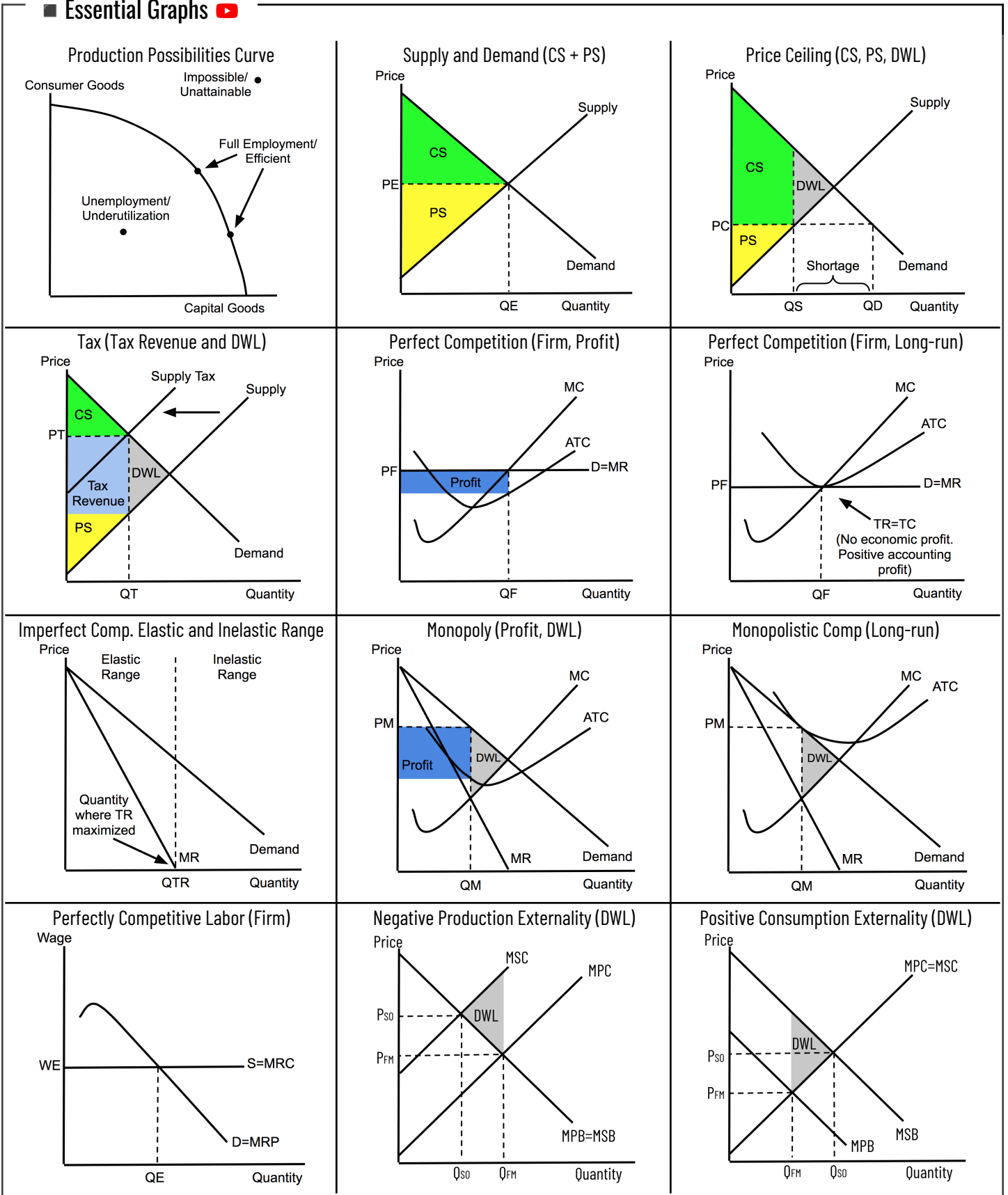
■ **Details to Remember**

19. Comparative advantage- A country should specialize, if they have a lower **opportunity cost** than another country.
20. Elasticity-
 - When price elasticity of demand coefficient is greater than 1, the demand is **relatively elastic** .
 - When price elasticity of demand coefficient is less than 1, the demand is **relatively inelastic** .
 - When price elasticity of demand coefficient is zero, the demand is **perfectly inelastic** .
 - When the cross-price elasticity is positive, the two goods are **substitutes** .
 - When the income elasticity is positive, the product is a **nominal good** .
21. Total revenue test- When demand is inelastic, an increase in the price will **increase** the total revenue.
22. Double shifts- When two curves shift at the same time, either price or quantity will be **indeterminate (ambiguous)** .
23. Price controls- To be binding, price ceilings go **below** equilibrium and price floors go **above** equilibrium.
24. Costs- Use marginal cost to determine the **quantity to produce** . Use average total cost to calculate **profit** .
25. Perfect competition- In the product market, marginal revenue is horizontal because firms are **price takers** .
26. Shut-down rule- Firms should shut down if the price falls below the **AVC (average variable cost)** .
27. Monopolies- Price is higher and output is lower than competitive markets causing **deadweight loss** .
28. Factor markets- In competitive markets, marginal factor cost is horizontal because firms are **wage takers** .
29. Government Regulation- A lump sum tax does not change quantity because it only affects the **fixed cost** .
30. Negative externalities- The free market makes too much output where the MSC is **greater** than MSB.
31. Positive externalities- The free market doesn't make enough output where the MSC is **less** than MSB.



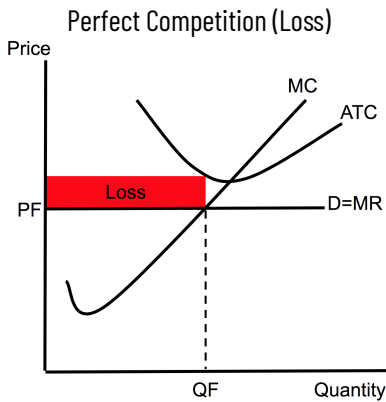
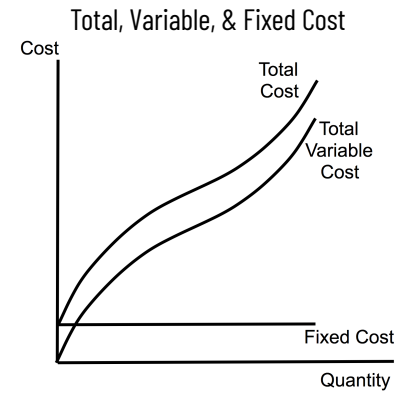
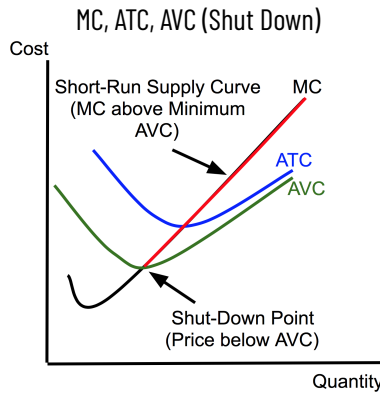
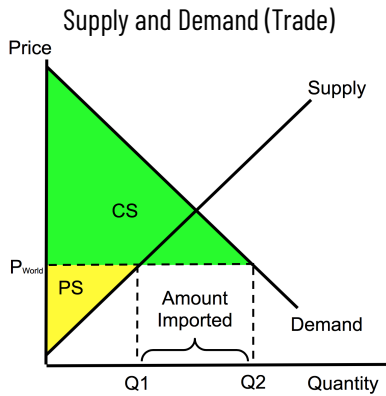
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Essential Graphs





■ Additional Graphs and Concepts



Payoff Matrix (Dominant Strategy, Nash Equilibrium)

Firm A

		Firm B	
		Charge High Price	Charge Low Price
Firm A	Charge High Price	\$1200* \$800* Nash Equilibrium	\$700 \$600
	Charge Low Price	\$1000 \$900*	\$1000* \$500

Note: 'DS' is circled in red in the original image.

