Master Formula & Rules Sheet

Units 1–3

STUDENT NAME: _____ DATE: _____ GOAL: 5 ☆

1. Scarcity & Profit Systems

Accounting Profit: Total Revenue − Explicit Costs

Economic Profit: Total Revenue − (Explicit + Implicit Costs)

Output Rule ("OOO"): Opp. Cost A = (Output B) / (Output A)

Input Rule ("IOU"): Opp. Cost A = (Input A) / (Input B)

Terms of Trade: Exporter Cost < Price < Importer Cost

2. Consumer Choice & Utility

Marginal Utility: $MU = \Delta TU / \Delta Q$

Utility Max Rule: $MU_X / P_X = MU_Y / P_Y$

Budget Constraint: $(P_X \times Q_X) + (P_Y \times Q_Y) \leq \text{Budget}$

Rebalancing: If $MU_X/P_X > MU_Y/P_Y$, buy **MORE X** & **LESS Y**.

3. Elasticity Formulas & Tests

Price Elasticity (E_d): $|\%\Delta Q_d / \%\Delta P|$

Cross-Price (E_{xy}): > 0 (Substitutes) | < 0 (Complements)

Income Elasticity (E_I): > 0 (Normal) | < 0 (Inferior)

Total Revenue Test:

- Inelastic ($E_d < 1$): P ↑ ⇒ TR ↑
- Elastic ($E_d > 1$): P ↑ ⇒ TR ↓
- Unit Elastic ($E_d = 1$): TR is maximized.

4. Welfare, Taxes & Controls

Consumer Surplus (CS): Max Willingness − Price

Producer Surplus (PS): Price − Marginal Cost

Price Ceiling: Binding *BELOW* P_{eq} → Shortage.

Price Floor: Binding *ABOVE* P_{eq} → Surplus.

Tax Incidence: More inelastic side pays larger tax share.

5. Production Functions & Short-Run / Long-Run Costs

Marginal Product: $MP = \Delta TP / \Delta L$

Marginal Cost: $MC = \Delta TC / \Delta Q = \Delta TVC / \Delta Q$

Total Cost: $TC = TFC + TVC$

Average Variable Cost: $AVC = TVC / Q$

Average Total Cost: $ATC = TC / Q = AFC + AVC$

Average Fixed Cost: $AFC = TFC / Q$

- **Intersections:** MC crosses AVC and ATC at their exact **minimum points**.

Master Formula & Rules Sheet

Units 4–6

6. The 4 Market Structures Master Matrix

Market Structure	Firms & Product	Demand Facing Firm	Profit Max Rule	Long-Run Profit	Efficiencies
Perfect Competition	Many · Identical	P = MR = AR = D (Horizontal)	MR = MC	Zero (Normal)	Productive (P = min ATC) & Allocative (P = MC)
Monopoly	One · Unique	Downward (MR < P)	MR = MC	Positive (π > 0)	Neither (Causes Deadweight Loss)
Monopolistic Comp.	Many · Differentiated	Downward (MR < P)	MR = MC	Zero (Normal)	Excess Capacity (P = ATC > min ATC)
Oligopoly	Few · Interdependent	Game Theory / Payoff Matrix	Nash Equilibrium	Positive (π > 0)	Neither (Cartels act like Monopolies)

- **Shut-Down Rules:** Short-Run: Shut down if P < min AVC. Long-Run: Exit industry if P < min ATC.
- **Regulated Natural Monopoly:** Socially Optimal: P = MC (Allocative). Fair-Return: P = ATC (Zero economic profit).

7. Factor Markets (Labor)

Marginal Revenue Product:
$MRP_L = MP_L \times P_x = \Delta TR / \Delta L$

Marginal Factor Cost:
$MFC_L = \Delta TC / \Delta L$ = Wage

Profit-Max Hiring Rule: $MRP_L = MFC_L$

Least-Cost Rule: $MP_L / P_L = MP_K / P_K$

Derived Demand: If $P_{good} \uparrow \Rightarrow MRP_L \uparrow \Rightarrow$ Hire More.

8. Market Failures & Externalities

Social Optimality: MSB = MSC

Negative Externality: MSC > MPC (Overproduced). Correct with **Per-Unit Pigouvian Tax**.

Positive Externality: MSB > MPB (Underproduced). Correct with **Per-Unit Subsidy**.

Public Goods: Non-excludable & Non-rivalrous.

Gini Coefficient: A / (A + B) (0 = Perfect Equality, 1 = Inequality).

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