**AP Macroeconomics Formulas**

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| **Comparative Advantage** - Who can make something at a lower opportunity cost. The cost is to the right of the = sign. | |
| **For Output Problems:**  Set each product's output equal to the other and solve for 1  **Example: Alpha can make 10 guns or 20 butter.**  10 G = 20 B  10 10  1G = 2B  1B = 1/2 G  Repeat for the other producer (Beta or whoever) | **For Input Problems:**    1 of a product = That product's input / the other products input  **Example: It take Zeta 60 hours to make 1 butter and 20 hours to make 1 gun.**  1 B = 60 / 20 = 3G  1 G = 1/2 B  Repeat for the other producer |
| **Nominal GDP (Gross Domestic Product)** - The total value of all goods and services produced in a year measured in that year's dollars.  Nominal GDP = Price x Quantity ( P x Q) | |
| **Real GDP (Gross Domestic Product)** - The total value of all goods and services produced in a year adjusted for inflation  Real GDP = (Nominal GDP / GDP Price Index) x 100 or Real GDP = Base year price x this year's quantity  **Real GDP - The Expenditures (spending) Approach:**  Real GDP = Consumption (C) + Gross Investment (Ig) + Government Spending (G) + Net Exports (Xn)  **Real GDP - The Income (earning) Approach:**  Real GDP = Wages + Rents + Interest + Profits + Adjustments | |
| **Gross Investment (Ig)** - All capital bought during a year.  Ig = Net Investment (In) + Depreciation  Which means:  Ig = Spending on New capital + spending to replace worn out existing capital | |
| **Net Exports (Xn)** - American products sold to other nations minus products purchased from other nations  Xn = Exports - Imports (or X - M) | |

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| **GDP Price Index (The GDP Deflator)** - The denominator in one of the Real GDP formulas  GDP Price Index = (Price of goods that year / Price of goods in the base year) \* 100  or  GDP Price Index = (Nominal GDP / Real GDP) \* 100 |
| **Percentage Change in Anything**  Percentage Change in Anything = (New Value - Old Value / Old Value ) x 100 |
| **Economic Growth Rate aka the Percentage change in Real GDP**  Percentage change in Real GDP = (New Real GDP - Old Real GDP / Old Real GDP) x 100 |
| **Real GDP Per Capita** - Real GDP per person, for estimating individual wealth in a nation.  Real GDP Per Capita = Real GDP that year / Population |
| **Percentage change in Real GDP per capita**  Percentage change in Real GDP per capita =  (New Real GDP per capita - Old Real GDP per capita / Old Real GDP per capita ) x 100 |
| **Doubling time formula**  Doubling time =70 / Annual percentage change in whatever you are looking at |
| **Labor Force** - The total number of non-institutionalized adults who want to employed.  Labor Force = The Employed + The Unemployed |
| **Labor Force participation rate** - The percent of non-institutionalized adults who want to be employed  Labor Force Participation Rate = Labor Force / Total non-institutionalized adults |
| **Unemployment Rate** - The percentage of non-institutionalized adults who want to be employed but are not.  Unemployment Rate = (Unemployed / Labor force) x 100 |
| **Consumer Price Index (CPI)** - A price index based on a market basket of goods purchased by the 'typical urban consumer.'  Consumer Price Index (CPI) = (Price of goods that year / price of goods in the base year) x 100 |

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| **Inflation Rate** - The rate of price level increase.  Inflation Rate = (New CPI - Old CPI / Old CPI ) x 100 |
| **Real Income** - What this year's income would be equivalent to in some other year because of inflation.  Real Income = This year's nominal income / CPI for the year some particular year |
| **Percentage change in real income** - How much of a 'real raise' someone gets after adjusting for inflation.  Percentage change in real income = Percentage change in nominal income - the inflation rate. |
| **Disposable Income -** The amount of income that households have left over after paying their personal taxes.  DI = personal income - personal taxes  DI = consumption + Savings (or C + S) |
| **The Average Propensity to Consume (APC)** - The percentage of total income that is consumed  APC = Consumption / Income |
| **The Average Propensity to Save (APS)** - The percentage of total income that is saved  APS = Savings / Income |
| **The Marginal Propensity to Consume (MPC)** - The percent of "extra" income that is consumed  MPC = Change in Consumption  Change in Income  or  MPC = 1 - MPS |
| **The Marginal Propensity to Save (MPS)** - The percent of "extra" income that is saved  MPS = Change in Savings  Change in Income  Or  MPS = 1 - MPC |

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| **Maximum possible increase or decrease in Aggregate Demand or GDP** - From the 'double shifting' AD curve  Maximum change in AD or GDP = The initial change in C, Ig, G, or Xn x The Expenditures Multiplier |
| **The Expenditures Multiplier** - For the previous formula  The Expenditures Multiplier = 1 / 1 - MPC or 1 / MPS |
| **The Tax Cut Multiplier** - For multiplying the effect of a change in taxes on AD or GDP  Tax Cut Multiplier = MPC / 1 - MPC |
| **The Monetary Base (M0 or MB)** - The amount of paper and coin currency in the nation.  M0 or MB = Currency held by the public + Bank reserves |
| **M1** - The simplest measure of the money supply.  M1 = Currency held by the public + Checkable Deposits (aka, Demand Deposits) |
| **M2** - Another possible measure of the money supply. It is M1 + 'near monies'  M2 = M1 + Savings accounts + Small time deposits + Money Market Mutual Funds held by individuals |
| **Actual Reserves (aka total reserves or just reserves)** - Cash held by banks in their vault or in their Fed account  Actual reserves = Required Reserves + Excess Reserves  Actual reserves = Reserves the bank cannot loan out + Reserves the bank can loan out. |
| **Required Reserves** - Reserves the bank must not loan out  Required Reserves = The Reserve Ratio (aka The Reserve Requirement) x Checkable Deposits |
| **Reserve Ratio (aka Reserve Requirement) -** The percent of checkable deposits that banks must not loan out. It is set by the Fed.  **Reserve Ratio (aka Reserve Requirement)** = Required Reserves / Checkable Deposits. |
| **The Monetary Multiplier - For use in the following formulae and for finding the maximum increase in almost anything in a T-account.**  The Monetary Multiplier = 1 / the reserve ratio |
| **The maximum possible increase in the M1 money supply from the banking system.**  Maximum increase in M1 from the banking system = The original excess reserves x the monetary multiplier |

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| **Maximum possible total M1 Money Supply**  1. Maximum M1 = The Monetary Base ( aka M0 or MB) x The Monetary Multiplier  or  2. Maximum M1 = M1 shown (aka currency held by the public + checkable deposits)  +  The maximum total possible increase in the M1 money supply from the banking system  (the previous formula) |
| **Expected Rate of Return** - The expected benefit of investing (Ig)  Expected Rate of Return = Expected profit (Which is expected revenue - The cost of the investment)  The cost of the investment |
| **Real interest rate** - The real cost of investing for businesses and the real benefit to banks of lending  Real interest rate = nominal interest rate (which is what the bank charges) - The inflation rate |
| **Expected real interest rate** - The **expected** real cost of investing for businesses and the **expected** real benefit to banks by lending.  Expected real interest rate = Nominal interest rate (which is what the bank charges) - The expected inflation rate |
| **The Aggregate Production Function** - A formula which lists the factors that cause long-run economic growth which is an increase in Real GDP per capita.  Real GDP  per capita = Technology \* Physical Capital per worker \* Human Capital per worker  (which measures  economic growth) |
| **Equation of Exchange -** An equation showing the relationship between the following variables according to the quantity theory of money.  M: The total money supply  V (The ‘Velocity’ of Money): The number of times each dollar is spent in a year.  P: The average price level  Q: The quantity of goods and services produced  MV = PQ (Each side is equal to nominal GDP; therefore, they are equal to each other) |