CHAPTER 1

REAL ESTATE APPRAISAL FORMULAS

1. GROSS INCOME MULTIPLIERS

The multipliers are often used in determining the value of a real property

PGI - Potential Gross Income
GIM - Gross Income Multiplier
V - Market Value (the use of Fair Market Value is not encouraged under the IVS/PVS)
EGI - Effective Gross Income
Re - Rental Rate
NIM - Net Income Multiplier
NOI - Net Operating Income

$$1.1\ GIM = \frac{V}{EGI}$$

Where: EGI = PGI – Vacancy, or Losses

$$1.2\ NIM = \frac{V}{NOI}$$

Where : NOI = EGI – Opex

$$1.3\ GIM = \frac{V}{Re}$$

2. CAPITALIZATION FORMULAS

CR - Capitalization Rate
I - Income (or Net Operating Income, NOI)
V - Market Value

$$2.1 \quad V = \frac{I}{CR}$$

3. TIME VALUE OF MONEY FORMULA

FV - Future Value
PV - Present Value
n - Duration; period (may be in years, months, days)
I - Interest rate; discount rate
PMT - Payment; Annuities xxx

$$3.1\ FV = PV\ (1+i)^n$$

$$3.2 \quad FV = \frac{PMT[(1+i)^n - 1]}{i}$$

3.3 Where : Sinking fund factor = $\frac{[(1+i)^n - 1]}{i}$

$$3.4 \quad PV = \frac{PMT\,[1-(1+i)^{-n}]}{i}$$

4. CAPITALIZATION RATE DERIVATION

SP - Selling Price
Opex - Operating Expense

$$4.1 \quad CR = \frac{NOI}{V\ (or\ SP)} = \frac{EGI - Opex}{V\ (or\ SP)}$$

4.2 CR = Over-all Rate = Recapture rate + Return of Capital (or Interest rate)

5. Mortgage Constant

MC - Mortgage Constant
ADS = Annual Debt Service (or annuity in some situations)
M = Mortgage; Mortgage Equity

$$5.1 \quad MC = \frac{ADS}{M} = \frac{i}{[1-(1+i)^{-n}]}$$

6. Equity Dividend Rate

ED - Equity Dividend
EDR - Equity Dividend Rate; Cash on Cash; Equity Yield Rate; Equity Capitalization Rate
E - Equity; Equity Investment

$$6.1 \quad EDR = \frac{ED}{E}$$

Where : ED = NOI – ADS

7. Debt Coverage Ratio

DCR - Debt Coverage Ratio

$$7.1 \qquad DCR = \frac{NOI}{ADS}$$

8. Band of Investment

CR - Capitalization Rate
M - Mortgage Constant
MP - Mortgage Position = LTV Ratio = Loan / Value
EP - Equity Position = 1 – LTV Ratio

$$8.1 \qquad CR = (MC\ x\ MP) + (EDR\ x\ EP)$$

9. Depreciation (Straight Line Method)

For machineries:

9.1 Composite Life = Total Depreciated Value / Annual Depreciation

9.2 Recapture = 1 / n

10. Simple Interest

I - Interest Rate
P - Principal
r - Rate of Interest
t - Time
F - Final Amount

10.1 I = Prt
10.2 F = P + I = P (1+rt)

Banker's Rate :

$$10.3 \quad I_o = \frac{Pr(number\ of\ days)}{360} = Ordinary\ Interest$$

$$10.3 \quad I_e = \frac{Pr(number\ of\ days)}{365} = Exact\ Interest$$

11. Simple Discount

11.1 D = Fdt

Where: D - Simple Discount
d - discount rate

11.2 $D = F - Pt = D / Fd$

Present Value or Proceeds:

11.3 $P = F - D = F (1 - dt)$

12. INCOME LADDER

Potential Gross Income (or Gross Scheduled Income)	**PGI**
Less: Vacancy and Losses	**(V/L)**
Effective Gross Income	**EGI**
Less: Operating Expenses	**(Opex)**
Net Operating Expense	**NOI**