Summary of Formulas

1	Return on the Investment, $(R_i) = \dfrac{V_E - V_B + D}{V_B}$ Where, R_i = Return on the investment V_E = End value of the investment V_B = Beginning value of the investment D = Distributions (i.e. dividends or interest paid)
2	Annual return, $1 + R = [(1 + r_1)(1 + r_2)(1 + r_3)(1 + r_4)]$ $R = [(1 + r_1)(1 + r_2)(1 + r_3)(1 + r_4)] - 1$ Where, r_1, r_2, r_3, r_4 = Quarterly returns
3	Total Return = $(NAV_2 – NAV_1)/NAV_1 \times 100\%$ Where, NAV_1 = Original price NAV_2 = Current price n = Number of years
4	Annualised Return = $(1+ \text{Total Return})^{(1/n)}-1$ Where, n = Number of years
5	Expected Return, $E(R_i) = \sum_{J=1}^{N}$(Probability of Return) (Possible Return) $= \sum_{j=1}^{N}(P_i)(R_i)$ Where, Pj is the probability of event j associated with return Rj_{for} security, i
6	Required Return = r + i + σ Where, r = Real interest rate i = Inflation rate σ = Risk premium
7	Capital Asset Pricing Model (CAPM), $E(R_i) = RFR + B_i (RM – RFR)$ Where, RFR = Expected Return on government securities B_i = Beta or Relative risk of the Stock i to the Market RM = Expected Return on the Stock Market Index
8	Aggregate Expenditure, (AE) = Aggregate Income (wages, rent, interest, etc) AE = C + I + G + (X – M) Where, C = Consumption I = Investment G = Government Purchases X = Exports M = Imports X-M = Net exports
9	Real GDP = (Nominal GDP) x 100 / (Price Index)

10	Return of a Portfolio, $(R_p) = \sum_{i=1}^{n}(w_i)(r_i)$ Where, R_p = Actual or expected return on the portfolio w_i = Portfolio weight for the i^{th} security r_i = Actual or expected return on the i^{th} security n = Number of different securities in the portfolio $\sum(w_i) = 1.0$
11	Portfolio Risk, $(\sigma_p) = \sqrt{w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + 2w_1w_2\rho_{1,2}\sigma_1\sigma_2}$ Where, w_1 and w_2 = Portfolio weights given to security 1 and security 2 respectively σ_1 and σ_2 = Standard deviation of security 1 and security 2 respectively $\rho_{1,2}$ = Correlation coefficient of security 1 and 2
12	Capital Market Line (CML), $E(R_p) = R_f + \frac{E(R_m) - R_f}{\sigma_m}\sigma_p$ Where, $E(R_p)$ = Expected return on any efficient portfolio on the CML R_f = Risk-free rate of return $E(R_m)$ = Expected return on market portfolio M σ_m = Standard deviation of the returns of market portfolio σ_p = Standard deviation of the efficient portfolio being considered
13	Security Market Line (SML), $E(R_i) = R_f + B_i[E(R_m) - R_f]$ Where, $E(R_p)$ = Expected return on security or portfolio R_f = Risk-free rate of return $E(R_m)$ = Expected return of overall market B_i = Beta of security or portfolio
14	Sharpe Ratio = $\frac{R_p - R_f}{\sigma_p}$ Where, R_p = Return on the portfolio R_f = Risk-free rate of return σ_p = Standard deviation of the portfolio
15	Yield, (Y) = $\frac{\text{Face Value - Purchase Price}}{\text{Face value}} \times \frac{360}{\text{No of Days to Maturity}}$ $= \frac{D}{F} \times \frac{360}{t}$ Where, Y = Annualised yield on a bank discount basis (in decimal form) or discount basis yield D = Dollar discount F = Face value t = Number of days remaining to maturity

16	Valuation for a Security, $(P_0) = \sum_{t=1}^{n} \frac{\text{Cash flows}}{(1+r)^t}$ = PV of future cash flows $(P_0) = \frac{CF_1}{1+r} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \ldots\ldots + \frac{CF_n}{(1+r)^n}$ Where, P_0 = Intrinsic value of the security today (the true value of the stock) CF_i = Cash flow at the end of Year i r = Discount rate reflecting the risk of the security. A more risky security would have a higher discount rate. Usually, the discount rate is the required return. n = Tenure of the security, in terms of compounding periods
17	Value of a Bond, $(P_0) = \sum_{t=1}^{n} \frac{\text{Coupons}}{(1+YTM)^t} + \frac{\text{Par Value}}{(1+YTM)^t}$ Where, P = Price of bond YTM = Yield to maturity t = End of period t
18	Price of a Perpetual Bond = $\frac{\text{Annual Coupon}}{\text{Interest Rate}}$
19	Modified Duration, $\Delta P/P = -D_{modified} \times \Delta YTM$ $\Delta P/P = -2 \times 1\% = -2\%$ Where, $-D_{modified}$ = Modified duration
20	Yield-to-Maturity, (YTM) = Capital Gains Yield + Current Yield Where, Capital gains yield = Price appreciation on the bond Current yield = $\frac{\text{Annual coupon}}{\text{Bond Price}}$
21	Historical P/E = $\frac{\text{Market Price}}{\text{Historical Earnings in the Past Year}}$ Leading P/E = $\frac{\text{Market Price}}{\text{Forecast Earnings in the Coming Year}}$ Where, Earnings per share = Net income / Number of common shares outstanding
22	PEG Measure, PEG = $\frac{P/E}{\text{Growth}}$
23	Price-to-Book Value, P/B = $\frac{\text{Market Price Per Share}}{\text{Book Value Per Share}}$
24	Price-to-Cash Flow, P/EBITDA = $\frac{\text{Market Price Per Share}}{\text{EBITDA}}$

25	Dividend Discount Model, $P_0 = \frac{D_1}{1+r_{CE}} + \frac{D_2}{(1+r_{CE})^2} + \frac{D_3}{(1+r_{CE})^3} + ... + \frac{D_\infty}{(1+r_{CE})^\infty}$ Where, P_0 = Intrinsic value (or fair value) per share (what the stock is worth now) D_1 = Dividend per share at the end of Year 1 D_2 = Dividend per share at the end of Year 2 r_{CE} = Cost of equity (or required return to equity)
26	Intrinsic Value per Share = B_0 + PV of Residual Income Where, B_0 = Beginning book value of equity per share Residual income = Net Income – Equity charge Equity charge = Beginning book value of equity per share x cost of equity
27	Time Value of Option = Actual Option Price – Intrinsic Value
28	Call Intrinsic Value = $S_T - X$ if $S_T > X$ or 0 if $S_T \leq X$ Where, S_T = Value of the underlying asset X = Exercise price of the asset
29	Payoff to call holder = $S_T - X$ if $S_T > X$ or 0 if $S_T \leq X$ Where, S_T is value of the underlying asset X is the exercise price of the asset
30	Payoff to call writer = $-(S_T - X)$ if $S_T > X$ or 0 if $S_T \leq X$ where S_T is value of the underlying asset X is the exercise price of the asset
31	Put Intrinsic Value = $X - S_T$ if $S_T < X$ or 0 if $S_T \geq X$ Where, S_T = Value of the underlying asset X = Exercise price of the asset
32	Payoff to put writer = $-(X - S_T)$ if $S_T < X$ or 0 if $S_T \geq X$ Where, S_T is value of the underlying asset X is the exercise price of the asset

33	Black Scholes Option Price Model, $C_0 = S_0 N(d_1) - \frac{X}{e^{rt}} N(d_2)$ $d_1 = \frac{\ln(S_0/X) + (r + \sigma^2/2)t}{\sigma\sqrt{t}}$ $d_2 = d_1 - \sigma\sqrt{t}$ Where, C_0 = Call option price X = Exercise price r = Continuously compounded riskless rate of interest on an annual basis t = Time to maturity in years σ = Standard deviation of the annual rate of return on the underlying stock ln = Natural logarithm function e = 2.71828, the base of the natural log function $N(d_1)$ = Cumulative density function of d_1
34	Delta = n x δWP/δS Where, Delta = Rate at which warrant price changes with change in share price δWP = Change in warrant price δS = Change in share price n = Conversion ratio
35	Effective Gearing = Delta x Simple Gearing
36	Implied Volatility = f (share price, warrant price, strike price, maturity, interest rate and dividend yield)
37	Gearing Ratio = $\frac{\text{Share Price}}{\text{Warrant Price x n}}$ Where, n = Conversion ratio
38	Intrinsic Value of Warrant, (Call Warrant) = S – X / n (Put Warrant) = X – S / n Where, S = Share price X = Exercise price n = Conversion ratio
39	Conversion Price of Warrant, (Call Warrant) = X + nWP (Put Warrant) = X – nWP Where, X = Exercise price WP = Warrant price n = Conversion ratio
40	Forward Exchange Rate = Spot rate ± Forward points
41	Forward Points = $\frac{S \times (R_c - R_b) \times n / 360}{1 + R_b \times n / 360}$ Where, S = Spot rate R_c = Annualised interest rate of counter-currency R_b = Annualised interest rate of base currency n = Number of days from spot date

42	Interest Rate Parity, $F = S \times \left(\dfrac{1 + R_c\,(n/360)}{1 + R_b\,(n/360)} \right)$ Where, F = Forward rate S = Spot rate R_c = Annualised interest rate of counter-currency R_b = Annualised interest rate of base currency n = Number of days
43	Range Accrual Note, (Reference index inside range) Payout = P1 x (n/N) (Reference index outside range) Payout = P2 x (N-n)/N Where, N = Total number of observations within a period n = Total number of observations when the index is inside range P1 = Payout when the index is inside the range P2 = Payout when the index is outside the range
44	Allocation to Risky Asset = Multiplier x Cushion value Where, Multiplier = 1/crash size
45	Portfolio's Expected Return, $E(R_e) = R_f + \beta_p\,[\,E(R_m) - R_f\,]$ Where, $E(R_e)$ = Expected return on the security, e $E(R_m)$ = Expected return of the market, m R_f = Risk-free rate β_p = Beta of portfolio
46	Sortino Ratio $= \dfrac{R_p - R_f}{\sigma_d}$ Where, R_p = Return on the portfolio R_f = Risk-free rate of return σ_d = Standard deviation of negative asset returns
47	Gross Rental Yield $= \dfrac{\text{Gross Annual Rental Income}}{\text{Gross Property Transacted Price}}$
48	Cap Rate $= \dfrac{\text{Annual Net Operating Income}}{\text{Property Transacted Price}}$ Where, Net Operating Income = Rental Income – Property Level Expenses
49	Equity Yield $= \dfrac{\text{Annual Cash Flow}}{\text{Total Amount Invested}}$ Where, Annual Cash Flow = Rental Income – All Expenses – Interest Cost – Tax + Depreciation & Amortization Total Amount Invested = Property Transacted Price – Loan Amount + Transaction Cost

50	$$\text{Return on Investment} = \frac{\text{Total Amount Generated} - \text{Total Amount Invested}}{\text{Total Amount Invested}}$$ Where, Total Amount Generated = All Annual Cash Inflow + Property Valuation – Remaining Loan – Transaction Cost Upon Sale
51	$$\text{Dividend Yield} = \frac{\text{Annual Dividend Distributed}}{\text{REIT Price}}$$ Where, Annual Dividend Distributed = Rental Income – All Expenses – Interest – Property Level Tax REIT Price = Purchase Price of REIT on IPO or when traded in Stock Exchange
52	$$\text{Leverage Ratio} = \frac{\text{Loan}}{\text{Market Value of Assets} - \text{Loans}}$$ or $$\text{Leverage Ratio} = \frac{\text{Loan}}{\text{Market Value of Assets}}$$
53	Margin % = Client's Equity / Total Financing Provided
54	$$\text{Margin Erosion} = \frac{\text{Loan Exposure} - \text{Market Value of Investments}}{\text{Lending Value}}$$ or $$= \frac{\text{Exposure} - \text{Lending Value}}{\text{Total Market Value} - \text{Lending Value}}$$ or $$= \frac{(\text{Loan/Market Value}) - (\text{Lending Value/Market Value})}{(1 - \text{Lending Value/Market Value})}$$