FIXED INCOME	Floating Rate Note Coupon	$\text{FRN coupon} = \text{MRR} + \text{Credit Spread}$	MRR – Market reference rate, stated as an annual percentage rate (it is sometimes known generically as Index)
	Conversion ratio	$\text{Conversion ratio} = \dfrac{\text{Convertible bond per value}}{\text{Conversion price}}$	
	Conversion value	$\text{Conversion value} = \text{Conversion ratio} \times \text{Current share price}$	
	Initial Margin	$\text{Initial Margin} = \dfrac{\text{Security price}_0}{\text{Purchase price}_0}$	Security price_0 – Market value of the security at the time of the initial transaction. Purchase price_0 – Price at which the investor agrees to buy the security at the time of the initial transaction.
	Haircut	$\text{Haircut} = \dfrac{\text{Security price}_0 - \text{Purchase price}_0}{\text{Security price}_0}$	
	Variation Margin	$\text{Variation Margin} = (\text{Initial Margin} \times \text{Purchase Price}_t) - \text{Security Price}_t$	Security price_t – Market value of the security at $T = t$ Purchase price_0 – Price at which the investor agrees to buy the security at $T = t$.
	Price (PV) of a Coupon Bond	$PV = \dfrac{PMT_1}{(1+r)^1} + \dfrac{PMT_2}{(1+r)^2} + \cdots + \dfrac{(PMT_N + FV_N)}{(1+r)^N}$	PV – Price of the bond. PMT – Coupon payment r – Market discount per period. FV – Bond's face value N – Number of periods to maturity

	Full Price or Dirty Price	$PV^{full} = PV^{flat} + AI$	PV^{full} – Full price PV^{flat} – Flat price AI – Accrued interest
	Accrued Interest (AI)	$\frac{t}{T} \times PMT$	t – Number of days from last coupon payment to settlement date T – Number of days in coupon period PMT – Coupon payment per period
	Full Price (PV^{full})	$PV^{full} = PV \times (1+r)^{\frac{t}{T}}$ Where: $PV = \frac{PMT_1}{(1+r)^1} + \frac{PMT_2}{(1+r)^2} + \cdots + \frac{(PMT_N + FV_N)}{(1+r)^N}$	PV – Price of the bond. r – Market discount per period. t – Number of days from last coupon payment to settlement date T – Number of days in coupon period
	Conversion of an Annualized Yield using One Periodicity to another Periodicity	$\left(1 + \frac{APR_m}{m}\right)^m = \left(1 + \frac{APR_n}{n}\right)^n$	APR_m – annual percentage rate for m periods per year APR_n – annual percentage rate for m periods per year
	Current Yield (CY)	$CY = \frac{\text{Annual Coupon}_t}{\text{Price}_t}$	

	Yield-to-Call	$$PV = \frac{PMT_1}{(1+r)^1} + \frac{PMT_2}{(1+r)^2} + \cdots + \frac{(PMT_N + \text{Call price})}{(1+r)^N}$$	PV – Price of the bond. PMT – Coupon payment per period Call price – Price at which a bond can be called on a given date r – Yield per period or market discount rate FV – Bond's face value N – Number of evenly spaced periods to the date when a bond can be called at the call price
	Yield Spreads	Def: The **yield spread** is the difference between the yield-to-maturity and the benchmark yield. **Benchmark Spread** = Yield spread over a specific benchmark (Risk premium for the credit and liquidity risks and possibly the tax impact of holding a specific bond.) **G – spread** = Yield spread in basis points over an actual or interpolated government bond yield (return for bearing risks relative to the sovereign bond) **I – Spread** = Interpolated yield spread for a bond over the standard swap rate in that currency of the same tenor (comparison against a short-term market-based reference rate) **Z – Spread** = zero-volatility, constant yield spread over a government (or interest rate swap) spot curve, or series of yields. **Option-Adjusted Spread (OAS)** = Z-spread – Option value in basis points per year (yield spread based on an option-pricing model and an assumption about future interest rate volatility.) i.e OAS = Z-spread – Option value in basis points per year.	
	Z-Spread Over the Benchmark Spot Curve	$$PV = \frac{PMT}{(1+z_1+Z)^1} + \frac{PMT}{(1+z_2+Z)^2} + \cdots + \frac{PMT + FV}{(1+z_N+Z)^N}$$	z_1, z_2, z_N – Benchmark spot or zero rates PMT – Coupon payment per period FV – Future value

	PV of Floating Rate Notes	$$\frac{\frac{(\mathrm{MRR}+\mathrm{QM})\times \mathrm{FV}}{m}}{\left(1+\frac{\mathrm{MRR}+\mathrm{DM}}{m}\right)^{1}}+\frac{\frac{(\mathrm{MRR}+\mathrm{QM})\times \mathrm{FV}}{m}}{\left(1+\frac{\mathrm{MRR}+\mathrm{DM}}{m}\right)^{2}}+\cdots\frac{\frac{(\mathrm{MRR}+\mathrm{QM})\times \mathrm{FV}}{m}}{\left(1+\frac{\mathrm{MRR}+\mathrm{DM}}{m}\right)^{N}}$$	PV – Present value, or the price of the floating– rate note Index – Reference rate, stated as an annual percentage rate QM – Quoted margin, stated as an annual percentage rate FV – Future value paid at maturity, or the par value of the bond m – Periodicity of the floating–rate note, the number of payment periods per year DM – Discount margin, the required margin stated as an annual percentage rate N – Number of evenly spaced periods to maturity
	Money Market Instruments Pricing Quoted on Discount Rate (DR) Basis	$$\mathrm{PV}=\mathrm{FV}\times\left(1-\frac{\mathrm{Days}}{\mathrm{Years}}\times \mathrm{DR}\right)$$	PV – Price of the money market instrument FV – Face value of the money market instrument Days – Number of days between settlement and maturity Year – Number of days in the year DR – The discount rate

	Money Market Instruments Pricing Quoted on an Add-on Rate Basis	$$PV = \frac{FV}{\left(1 + \frac{Days}{Year} \times AOR\right)}$$	PV – Price of the money market instrument FV – Face value of the money market instrument Days – Number of days between settlement and maturity Year – Number of days in the year AOR – The add-on rate
	Bond Pricing Using Spot Rates	$$PV = \frac{PMT}{(1 + Z_1)^1} + \frac{PMT}{(1 + Z_2)^2} + \cdots + \frac{PMT + FV}{(1 + Z_N)^N}$$	Z_1 – Spot rate, or zero-coupon yield or zero rate, for period 1 Z_2 – Spot rate, or zero-coupon yield or zero rate, for period 2 Z_N – Spot rate, or zero-coupon yield or zero rate, for period N
	Calculating Implied Forward Rates using Spot Rates	$$(1 + Z_A)^A \times (1 + IFR_{A,B-A})^{B-A} = (1 + Z_B)^B$$	Z_A – Shorter-term spot rates. Z_B – Longer-term spot rate. $IFR_{A,B-A}$ – Implied forward rate for a security begins at t = A and matures at t = B (tenor B – A).
	Interpreting Forward Rate	Example: "4y2y" is read as "four-year into two-year rate **Implication:** First number is the length of the shorter spot rate, and the second number is the tenor of the implied forward rate. 4y2y can be written as: $$4y2y = (1 + Z_4)^4 \times (1 + IFR_{4,2})^2 = (1 + Z_6)^6$$	
	Duration Gap	$$\text{Duration gap} = \text{Macaulay duration} - \text{Investment horizon}$$	

	MacDur	$$\text{MacDur} = \left\{\left(1-\frac{t}{T}\right)\left[\frac{\frac{PMT}{(1+r)^{1-\frac{t}{T}}}}{PV^{Full}}\right] + \left(2-\frac{t}{T}\right)\left[\frac{\frac{PMT}{(1+r)^{2-\frac{t}{T}}}}{PV^{Full}}\right] + \cdots + \left(N-\frac{t}{T}\right)\left[\frac{\frac{PMT}{(1+r)^{N-\frac{t}{T}}}}{PV^{Full}}\right]\right\}$$	t – Number of days from the last coupon payment to the settlement date T – Number of days in the coupon period t/T – Fraction of the coupon period that has passed since the last payment PMT – Coupon payment per period FV – Future value paid at maturity, or the par value of the bond r – Yield-to-maturity per period N – Number of evenly spaced periods to maturity as of the beginning of the current period.
	MacDur (Closed Form)	$$\text{MacDur} = \left\{\frac{1+r}{r} + \frac{1+r+[N\times(c-r)]}{c\times[(1+r)^N-1+r]}\right\} - \frac{t}{T}$$	r – Yield-to-maturity per period N – Number of evenly spaced periods to maturity as of the beginning of the current period c – Coupon rate per period t – Number of days from the last coupon payment to the settlement date T – Number of days in the coupon period.

	Modified Duration	$\text{ModDur} = \frac{\text{MacDur}}{(1+r)}$	
	Percentage Price Change for a Bond given a Change in its Yield-to-Maturity using Modified Duration	$\%\Delta PV^{\text{full}} \approx -\text{AnnModDur} \times \Delta\text{AnnYield}$	AnnModDur – Annualized modified duration. ΔAnnYield – Change in annualized yield-to-maturity.
	Approximate Modified Duration	$\text{AnnModDur} \approx \frac{(PV_-) - (PV_+)}{2 \times (\Delta\text{Yield}) \times (PV_0)}$	(PV_-) and (PV_+) – Change in bond price due decrease and increase in yield-to-maturity by the same amount, respectively. ΔYield – Change in yield-to-maturity. PV_0 – Quoted full price of the bond
	Approximate Macaulay Duration	$\text{AnnMacDur} \approx \text{AnnModDur} \times (1 + r)$	AnnMacDur – Approximate modified duration AnnModDur – Approximate modified duration. r – Yield per period.
	Money Duration	$\text{MoneyDur} = \text{AnnModDur} \times PV^{\text{full}}$	MoneyDur – Money duration AnnModDur – Annualized Modified Duration
	Percentage Price using Money Duration Estimates the Change in Currency Units.	$\%\Delta PV^{\text{full}} \approx -\text{MoneyDur} \times \Delta\text{Yield}$	ΔYield – Change in yield-to-maturity.

	Modified Duration	$$\text{ModDur} = \frac{\text{MacDur}}{(1 + \text{YTM})}$$	MacDur – Macaulay Duration YTM – Yield– To– Maturity
	Price Value of Basis Point	$$\text{PVBP} = \frac{\text{PV}_{-} - \text{PV}_{+}}{2}$$	PV_{-} – Price of bond due to a 0.01% **decrease** in the YTM PV_{+}– Price of bond due to a 0.01% **increase** in the YTM
	Macaulay Duration of a Zero-Coupon Bond	$$\text{MacDur} = \text{Time to Maturity}$$	
	Macaulay Duration of Perpetual Bond	$$\text{MacDur} = \frac{(1 + r)}{r}$$	r – Yield per period
	Macaulay Duration of Floating-Rate Notes and Loans	$$\text{MacDur}_{\text{Floating}} = \frac{(T - t)}{T}$$	T – Total time-to-maturity t – Time that have passed since the last coupon
	% Price Change of a Bond Using Modified Duration and Convexity	$$\%\Delta\text{PV}_{\text{full}} \approx (-\text{AnnModDur} \times \Delta\text{Yield}) + \left[\frac{1}{2} \times \text{AnnConvexity} \times (\Delta\text{Yield})^2\right]$$	AnnModDur – Annualized Modified Duration AnnConvexity – Annualized Convexity ΔYield – Change in yield-to-maturity
	Approximate Convexity	$$\text{ApproxCon} = \frac{(\text{PV}_{-}) + (\text{PV}_{+}) - [2 \times (\text{PV}_0)]}{(\Delta\text{Yield})^2 \times (\text{PV}_0)}$$	(PV_{-}) and (PV_{+}) – Change in bond price due decrease and increase in yield-to-maturity by the same amount, respectively. ΔYield – Change in yield-to-maturity. PV_0 – Quoted full price of the bond

	Money Convexity	$\text{MoneyCon} = \text{AnnConvexity} \times \text{PV}^{\text{Full}}$	
	Approximate Percentage Change using Money Duration and Money Convexity	$\%\Delta\text{PV}_{\text{full}} \approx -(\text{MoneyDur} \times \Delta\text{Yield}) + \left[\frac{1}{2} \times \text{MoneyCon} \times (\Delta\text{Yield})^2\right]$	
	Approximate Effective Duration	$\text{EffeDur} \approx \frac{(\text{PV}_-) - (\text{PV}_+)}{2 \times (\Delta\text{curve}) \times (\text{PV}_o)}$	Δcurve – Change in the yield curve
	Approximate Effective Convexity	$\text{EffeD} \approx \frac{[(\text{PV}_-) + (\text{PV}_+)] - [2 \times (\text{PV}_0)]}{(\Delta\text{curve})^2 \times (\text{PV}_o)}$	
	Percentage Change in a Bond's Full Price for a Given Shift in the Benchmark Yield Curve (ΔCurve)	$\%\Delta\text{PV}_{\text{full}} \approx (-\text{EffDur} \times \Delta\text{Curve}) + \left[\frac{1}{2} \times \text{EffCon} \times (\Delta\text{Curve})^2\right]$	
	Key Rate Duration	$\text{KeyRateDur}_k = -\frac{1}{\text{PV}} \times \frac{\Delta\text{PV}}{\Delta r_k}$	r_k – kth key rate
	Relationship between Key Rate Duration and Effective Duration	$\text{EffDur} = \sum_{k=1}^{n} \text{KeyRateDur}_k$	EE – Expected exposure RR – Recovery rate

	Expected Loss (EL)	Expected Loss (EL) = Probability of default (POD) × Loss given default (LGD)	
	Credit Spread	$\text{Credit Spread} \approx \text{POD} \times \text{LGD}$	POD – Probability of Default LGD – Loss Given Default
	Impact of Yield Spread on Bond's Price	$\%\Delta \text{PV}^{\text{Full}} = -\text{AnnModDur} \times \Delta\text{Spread}$	
	Impact of Yield Spread on Bond's Price, Incorporating Convexity Effect	$\%\Delta \text{PV}^{\text{Full}} = -(\text{AnnModDur} \times \Delta\text{Spread}) + \frac{1}{2} \times \text{AnnConvexity} \times (\Delta\text{Spread})^2$	
	Loan-to-value ratio (LTV)	$\text{LTV} = \frac{\text{Amount of the loan or Mortgage}}{\text{Property's value}}$	
	Debt Service Coverage Ratio (DSCR)	$\text{DSCR} = \frac{\text{Net Operating Income}}{\text{Debt Service}}$	
	Net Operating Income (NOI)	$\text{NOI} = (\text{Rental income} - \text{Cash operating income}) - \text{replacement reserves}$	
	Call option buyer's payoffs at expiration	$c_T = \text{Max}(0, S_T - X)$	S_T – Underlying spot price at time t = T X – Exercise price