$$P_0 = \frac{P_n}{(1+r)^n} \quad P_n = P_0 * \left(1 + \frac{r_{freq}}{m}\right)^{m*n} \quad P_n = P_0 e^{r*n} \quad P_0 = \sum_{t=1}^{T} \frac{C_t}{(1+r)^t} + \frac{M}{(1+r)^T} \quad (1+r) = \left(1 + \frac{r_{freq}}{m}\right)^{m*n}$$

$$a)\ w\ periods = \frac{days\ left\ before\ next\ coupon\ payment}{days\ in\ a\ coupon\ period} \qquad r_c = m * \ln\left(1 + \frac{r_{freq}}{m}\right)$$

$$b)\ Present\ Value = \frac{Expected\ Cashflow}{(1+r)^{t-1+w}} \qquad ; r_{freq} = m\left(e^{\frac{r_c}{m}} - 1\right)$$

$$Days\ in\ accrued\ interest\ period = days\ in\ coupon\ period - days\ left\ before\ next\ coupon\ payment$$

$$Accrued\ Interest = Coupon * (1 - w)$$

$$Clean\ price = Dirty\ price - Accrued\ Interest \qquad P_0 = \sum_{i=1}^{n} \frac{c_i}{(1+y)^i} \qquad Par\ Value = \sum_{i=1}^{n} \frac{c_i}{(1+y)^i}$$

$$P_0 = \sum_{i=1}^{n} c_i\, e^{-yt_i} \quad D = \frac{\sum_{i=1}^{n} t_i c_i\, e^{-yt_i}}{P_0} = \sum_{i=1}^{n} t_i \left[\frac{c_i e^{-yt_i}}{P_0}\right] \qquad \Delta P_0 = \frac{-P_0 D \Delta y_c}{1 + \frac{y_m}{m}} \qquad MD = \frac{D}{1 + \frac{y_m}{m}}$$

$$\Delta P_0 = -P_0 MD \Delta y \qquad \Delta P_0 = -D\Delta y P_0 \qquad \frac{\Delta P_0}{P_0} = -D\Delta y \Leftrightarrow -\frac{\Delta P_0}{\Delta y} = \underbrace{DP_0}_{\textbf{Dollar Duration}}$$

$$R_{T_1,T_2} = \frac{R_2 T_2 - R_1 T_1}{T_2 - T_1} \qquad L(R_k - R_m)(T_2 - T_1) \qquad \frac{L(R_k - R_m)(T_2 - T_1)}{1 + R_m(T_2 - T_1)}$$

$$P_0 = L(R_k - R_f)(T_2 - T_1)e^{-R_2 T_2} \qquad \sum_{i=0}^{n} LR_{k,i}(T_{i+1} - T_i) - LR_{m,i}(T_{i+1} - T_i) = \sum_{i=0}^{n} L(R_{k,i} - R_{m,i})(T_{i+1} - T_i)$$

$$V_{swap,0} = B_{fix} - B_{flt} \qquad V_{swap,0} = \sum_{i=0}^{n} L(R_{f,t_i} - R_{k,t_i}) T_{freq}\, e^{-r(T_{i+1} - T_0)} \qquad B_{fix} = \sum_{t=1}^{T} C_t e^{-rt} + Me^{-rT}$$

$$V_{swap,0} = B_{flt} - B_{fix} \qquad V_{swap,0} = \sum_{i=0}^{n} L(R_{k,t_i} - R_{f,t_i}) T_{freq}\, e^{-r(T_{i+1} - T_0)} \qquad B_{flt} = \sum_{t=1}^{T} C_t e^{-rt} + Me^{-rt}$$

$$F = S(t)e^{r(T-t)} \qquad \begin{matrix} Call_T = max(S_T - K, 0) \\ Put_T = max(K - S_T, 0) \end{matrix} \qquad p + S_0 = c + Ke^{-rT} + D \qquad \Delta = \frac{f_u - f_d}{S_0 u - S_0 d}$$

$$f = e^{-rT}[pf_u + (1-p)f_d] \qquad where \qquad p = \frac{e^{rT} - d}{u - d}$$

$$E(S_T) = pS_0 u + (1-p)S_0 d \qquad E(S_T) = S_0 e^{rT}$$