Formulas

Financial Statement Analysis

Current Ratio = Current Assets / Current Liabilities
Quick Ratio = (Current Assets – Inventory) / Current Liabilities
Cash Ratio = Cash / Current Liabilities
Debt Ratio = Total Liabilities / Total Assets
Debt-Equity Ratio = Total Liabilities / Total Equity
Equity Multiplier = Total Assets / Total Equity
Times Interest Earned Ratio = EBIT / Interest
Cash Coverage = (EBIT + Depreciation & Amort.) / Interest
Inventory Turnover = COGS / Inventory
Days' Sales in Inventory = 365 Days / Inventory Turnover
Receivables Turnover = Sales / Accounts Receivable
Days' Sales in Receivables = 365 Days / Receivables Turnover
Total Asset Turnover = Sales / Total Assets
Net Profit Margin = Net Income / Sales
EBITDA Margin = EBITDA / Sales
Return on Assets (ROA) = Net Income / Total Assets
Return on Equity (ROE) = Net Income / Total Equity
Earnings per Share = Net Income / Shares Outstanding
Price / Earnings (PE) Ratio = Price per Share / Earnings per Share
Market-to-Book (M / B) Ratio = Market Value per Share / Book Value per Share
Market Capitalization = Price per Share x Shares Outstanding
Enterprise Value = Market Cap. + Market Value of Interest-bearing Debt - Cash
Enterprise Value Multiple = EV / EBITDA
DuPont Identity: ROE = Profit Margin x Total Asset Turnover x Equity Multiplier

Forecasting

External Financing Needed = (Assets/Sales) x ΔSales –
(Spontaneous Liabilities/Sales) x ΔSales –
(Net Income/Sales) x Projected Sales x (1 – Dividends/Net Income)

$$\text{Internal Growth Rate} = \frac{\text{ROA x}\left(1 - \frac{\text{Dividends}}{Net\ Income}\right)}{1 - \left[\text{ROA x}\left(1 - \frac{\text{Dividends}}{Net\ Income}\right)\right]}$$

$$\text{Sustainable Growth Rate} = \frac{\text{ROE x}\left(1 - \frac{\text{Dividends}}{Net\ Income}\right)}{1 - \left[\text{ROE x}\left(1 - \frac{\text{Dividends}}{Net\ Income}\right)\right]}$$

Present Value and Future Value of a Single Cash Flow

$FV_t = PV_0 \times (1 + r)^t$ $\qquad PV_0 = \dfrac{FV_t}{(1+r)^t}$

Where: PV = present value
FV = future value

Present Value of Perpetuities

Perpetuity: $PV_0 = \dfrac{CF_1}{r}$ $\qquad$ Growing Perpetuity: $PV_0 = \dfrac{CF_1}{r-g}$

Present Value and Future Value of Ordinary Annuities

$PV_0 = \dfrac{CF_1}{r} \times \left[1 - \dfrac{1}{(1+r)^t}\right]$ $\qquad FV_t = \dfrac{CF}{r} \times \left[(1+r)^t - 1\right]$

Effective Annual Rate

$$EAR = \left[1 + \left(\frac{APR}{m}\right)\right]^m - 1$$

Where: m = number of compounding periods per year.
APR = Annual Percentage Rate.

Final Exam Formula Sheet

Risk and Return

$$\text{Percentage return} = \frac{\text{Cash flow over the period} + \text{Change in market value}}{\text{Beginning market value}}$$

CAPM (the Security Market Line): $E[R_i] = R_f + \beta_i\left(R_m - R_f\right)$

Where: R_m is the expected return of the market.
R_f is the risk-free rate of return.

Sample variance: $\sigma^2 = \left[\frac{1}{T-1}\right] \times \left[\left(R_1 - \overline{R}\right)^2 + \left(R_2 - \overline{R}\right)^2 + \ldots + \left(R_T - \overline{R}\right)^2\right]$

$$\sigma^2 = \frac{1}{T-1}\sum_{t=1}^{T}\left(R_t - \overline{R}\right)^2$$

Variance of expected returns: $\sigma^2 = \left[P_1 \times \left(R_1 - \overline{R}\right)^2\right] + \left[P_2 \times \left(R_2 - \overline{R}\right)^2\right] + \ldots + \left[P_T \times \left(R_T - \overline{R}\right)^2\right]$

Covariance: $Cov(X,Y) = P_1\left[\left(X_1 - \overline{X}\right)\left(Y_1 - \overline{Y}\right)\right] + P_2\left[\left(X_2 - \overline{X}\right)\left(Y_2 - \overline{Y}\right)\right] + \ldots$

$$\sigma^2 = \sum_{t=1}^{T} P_t \times \left(R_t - \overline{R}\right)^2$$

$$Cov(X,Y) = \sum_{t=1}^{T} P_t\left(X_t - \overline{X}\right)\left(Y_t - \overline{Y}\right)$$

$$Cov(X,Y) = \rho_{X,Y} \times \sigma_X \times \sigma_Y$$

Portfolio Variance: $\sigma_p^2 = w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + 2w_1w_2Cov(R_1, R_2)$

$$\sigma_p^2 = w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + 2w_1w_2\rho_{1,2}\sigma_1\sigma_2$$

Cost of Capital

$$WACC = \left[\left(\frac{E}{D+P+E}\right)\times R_E\right] + \left[\left(\frac{P}{D+P+E}\right)\times R_P\right] + \left[\left(\frac{D}{D+P+E}\right)\times R_D \times (1-T)\right]$$

Where: D = *market value of total debt*
P = *market value of preferred stock*
E = *market value of common stock*
T = *tax rate*
R_D = *cost of debt*
R_P = *cost of preferred stock*
R_E = *cost of common stock*

MACRS Depreciation Rates

	Recovery Period Class	
Years	**3-Year**	**5-Year**
1	33.33%	20.00%
2	44.45%	32.00%
3	14.81%	19.20%
4	7.41%	11.52%
5		11.52%
6		5.76%

Inflation

$$(1+r_n) = (1+r_r) \times (1+i)$$

$$r_n = r_r + i + (r_r \times i)$$

Capital Structure

$$\beta_{\text{Asset}} = \frac{\text{Equity}}{\text{Equity} + [(1 - t) \times \text{Debt}]} \times \beta_{\text{Equity}}$$

$$\beta_{\text{Equity}} = \beta_{\text{Asset}} \times \left[1 + (1 - t)\frac{\text{Debt}}{\text{Equity}}\right]$$

$$R_E = R_A + (R_A - R_D)(D/E)(1 - t)$$