Financial Formulas Reference

# 1. Time Value of Money

* Future Value (FV) = PV × (1 + r)^n
* Present Value (PV) = FV / (1 + r)^n
* Annuity FV = PMT × [(1 + r)^n – 1] / r
* Annuity PV = PMT × [1 – (1 + r)^-n] / r
* Perpetuity PV = PMT / r

# 2. Interest Rates

* Effective Annual Rate (EAR) = (1 + APR/m)^m – 1
* APR = EAR × m / [(1 + EAR)^(1/m) – 1]

# 3. Bonds

* Bond Price = Σ (Coupon Payment / (1 + r)^t) + (Face Value / (1 + r)^n)
* Current Yield = Annual Coupon Payment / Market Price
* Yield to Maturity (YTM): solve for r in bond price formula

# 4. Stocks

* Dividend Discount Model (DDM): P = D / (r - g)
* Gordon Growth Model: P = D0 × (1 + g) / (r - g)

# 5. Capital Budgeting

* Net Present Value (NPV) = Σ (Cash Flow / (1 + r)^t) - Initial Investment
* Internal Rate of Return (IRR): solve for r where NPV = 0
* Payback Period = Time to recover initial investment
* Profitability Index (PI) = PV of Future Cash Flows / Initial Investment

# 6. Risk and Return

* Expected Return (E) = Σ (Probability × Return)
* Variance (σ²) = Σ [Probability × (Return – Expected Return)²]
* Standard Deviation (σ) = √Variance
* Covariance = Σ [Probability × (RA – E(RA)) × (RB – E(RB))]
* Correlation = Covariance / (σA × σB)

# 7. Portfolio Theory

* Portfolio Return = Σ (Weight × Return)
* Portfolio Variance (2 assets) = (wA² × σA²) + (wB² × σB²) + 2wAwB × Cov(A,B)

# 8. CAPM (Capital Asset Pricing Model)

* Expected Return = Risk-Free Rate + Beta × (Market Return – Risk-Free Rate)
* Beta = Covariance(Return, Market Return) / Variance(Market Return)

# 9. Cost of Capital

* WACC = (E/V × Re) + (D/V × Rd × (1 - Tax Rate))
* Cost of Equity (Re) = Risk-Free Rate + Beta × (Market Return – Risk-Free Rate)
* Cost of Debt (Rd): usually given or estimated based on bond yields

# 10. Financial Ratios

* Current Ratio = Current Assets / Current Liabilities
* Quick Ratio = (Current Assets – Inventory) / Current Liabilities
* Debt-to-Equity = Total Debt / Total Equity
* ROA = Net Income / Total Assets
* ROE = Net Income / Shareholder's Equity
* EPS = (Net Income – Preferred Dividends) / Average Outstanding Shares
* P/E Ratio = Price per Share / Earnings per Share