**Expanded Study Guide: Finance Placement Exam Mastery**

This comprehensive guide is structured like a textbook, covering each key topic with clear explanations, examples, and practice problems. Each section also recommends effective learning resources (tutorials, interactive websites, videos) to reinforce your understanding. The goal is to provide the most effective learning tool for complete mastery of these finance fundamentals, especially in preparation for the 1 2

Accelerated Corporate Finance (ACF) qualifying exam .

**1. Present Value Calculations and Time Value of Money Key Concepts**

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**Time Value of Money (TVM):** A core principle of finance stating that a sum of money today is worth 3

more than the same sum in the future . Essentially, money’s value depends on how long until you use it; the sooner you have it, the more potential it has to earn returns. This is because of: • 4

*Opportunity Cost*: Money now can be invested to earn interest, increasing its future value . •

*Inflation*: Money will likely buy less in the future than today (future purchasing power erodes). • 4

*Uncertainty*: Future receipt is not guaranteed until it’s actually received .

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**Present Value (PV):** The value today of an expected future cash flow, found by *discounting* that

future amount by an appropriate interest rate (discount rate). Formally, for a single future amount: $ $ PV = \frac{\text{Future Value}}{(1 + r)^n} $$ This formula “converts” future dollars into today’s 5

dollars . Present value reflects the time value of money by answering, *“How much is a future sum* 6 7

*worth right now?”* . For multiple cash flows, compute the PV of each and sum them up .

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**Future Value (FV):** The amount an investment today will grow to in the future, after earning interest. Using compounding, $$ FV = PV \times (1+r)^n, $$ which is essentially the PV formula rearranged. Future value projects today’s money forward in time at rate *r*, showing how much it will be worth 8

after *n* periods .

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**Loan Payments (Annuity Application):** Calculating a loan’s payment amount is an application of

present value. A loan is the present value and the payments form an annuity. For example, the fixed payment on a loan can be found using the annuity PV formula or Excel’s PMT function. (See the **Excel Application** below and Topic 6 for more on Excel functions.)

**Why these concepts matter:** Understanding PV and FV is crucial for valuing investments, comparing cash flows at different times, and making informed financial decisions. Any financial transaction that spans time 5

(loans, investments, savings, etc.) relies on TVM logic . Most errors in finance stem from misapplying these fundamentals rather than math mistakes.

**Instructional Resources**

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*Video Tutorial:* **Khan Academy – Time Value of Money** – A beginner-friendly introduction to why 3

money now is worth more than later (with examples of compounding and discounting) [2]. 1

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*In-Depth Explanation:* **Investopedia: Present Value** – Detailed article explaining PV with formulas 9 10

and examples [1]. Covers the reasoning (money today can be invested to grow) and walks through PV calculations.

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*Practice Worksheet:* **Wall Street Prep – Time Value of Money** [3] – Provides an Excel-based tutorial and practice problems to calculate PV/FV for single sums and annuities.

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*Real-Life Application:* **“A Journey Through Time: Applied TVM”** – An academic case study illustrating TVM in retirement planning [4]. This shows how TVM concepts apply to real financial decisions (e.g. saving for retirement).

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*Step-by-Step Video:* **YouTube – Time Value of Money Explained** – A step-by-step walkthrough of calculating PV and FV for different scenarios, ideal for beginners [5].

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*Additional Video:* **YouTube – Present Value vs. Future Value** – A short tutorial highlighting the difference between PV and FV with simple examples (why $100 today is not equal to $100 in five 11

years) .

**Excel Application**

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*Practice with Excel:* Spreadsheets can speed up TVM calculations and reduce errors. Create a table of future cash flows and use Excel’s built-in PV function to compute each cash flow’s present value at a 12

given discount rate . Sum these to get the total PV (this is how Excel’s NPV function works for periodic cash flows). For example, use =PV(rate, nper, pmt, FV, type) to find the present value. In this function:

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**rate** = discount rate per period,

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**nper** = number of periods,

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**pmt** = periodic payment (if any, for annuities),

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**FV** = future value (if a lump sum at end), •

**type** = when payments are made (0 for end of period, 1 for beginning).

*Tip:* Be mindful of Excel’s sign convention – cash outflows (payments) may need to be input as negative to get a positive PV. You can also use NPV for a series of cash flows occurring at regular intervals, and RATE , NPER , or PMT to solve for other variables. **Experiment:** Calculate the payment on a loan using PMT : e.g., =PMT(0.06, 3, -5000) would give the annual payment to amortize a $5,000 loan over 3 years at 6%.

**Example**

**Calculate the present value of $5,000 to be received in 3 years if the discount rate is 6%.** Using the formula: $$ PV = \frac{5,000}{(1+0.06)^3} $$

$PV \approx \frac{5,000}{1.191016} \approx \$4,198.$

**Explanation:** Receiving \$5,000 in 3 years is equivalent to about \$4,198 in today’s dollars at a 6% rate. This makes sense because of the time value of money – \$4,198 invested today at 6% for 3 years would grow to roughly \$5,000.

**Practice Problems**

1.

**Single Future Sum:** Find the present value of \$10,000 to be received in 5 years at an 8% annual discount rate. *(Hint: Use the PV formula or Excel’s PV function.)*

2.

**Loan Payment:** If you borrow \$15,000 at 7% annual interest to be repaid over 4 years, what are the

equal annual payments? *(Use the annuity formula or Excel’s PMT function to solve. The answer will be the payment that results in a PV of \$15,000)*.

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3.

**Multi-Flow PV:** Calculate the present value of receiving \$3,000 one year from now and \$3,000 two

years from now, if the discount rate is 5%. *(Calculate each separately and add, or use Excel.)*

**2. Portfolio Expected Return and Risk (Variance/Standard Deviation)**

**Key Concepts**

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**Expected Return:** The weighted average return of a portfolio’s components. In a portfolio context,

it’s calculated by multiplying each asset’s expected return by its portfolio weight and summing up

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. If probabilities of outcomes are given (for a single asset or the whole portfolio), expected return 14

is the probability-weighted average of possible returns . Essentially, it answers *“on average, what return should we expect?”*.

*Formula (Portfolio):* $$ E(R\_{portfolio}) = w\_1 E(R\_1) + w\_2 E(R\_2) + \dots + w\_n E(R\_n), $$ where $w\_i$ is the fraction of the portfolio in asset *i* (weights sum to 1). For example, if 60% is in Asset A 13

(expected 12%) and 40% in Asset B (expected 8%), then $E(R) = 0.6(12\%) + 0.4(8\%) = 10.4\%$ .

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**Portfolio Variance and Standard Deviation (Risk):** Variance measures the dispersion of returns –

how much the portfolio’s returns fluctuate around the mean. Standard deviation is the square root of variance and is often used as the *total risk* of the portfolio. To calculate a two-asset portfolio variance: $$ \sigma\_p^2 = w\_1^2\sigma\_1^2 + w\_2^2\sigma\_2^2 + 2\,w\_1 w\_2 \mathrm{Cov}(R\_1,R\_2). $$ This formula shows risk depends on each asset’s variance *and* the covariance (or correlation) between 15 16

assets . If you have more assets, all pairwise covariances matter . The portfolio standard deviation is $\sigma\_p = \sqrt{\sigma\_p^2}$.

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**Diversification Effect:** One of the most important insights in finance is that combining assets can

reduce risk. If assets are not perfectly correlated, the portfolio’s risk is **less** than the weighted 17

average of individual risks . In other words, some ups and downs cancel out. Diversification 18

benefits are larger when assets’ returns have low or negative correlation . The extreme case: if two assets are perfectly negatively correlated, the portfolio can have very low risk. *Bottom line:* holding a mix of investments can achieve the same expected return with lower volatility than a single asset. This is the basis of Modern Portfolio Theory and why “don’t put all your eggs in one basket” is 19 20

so important in investing .

**Why these concepts matter:** For any investor, understanding expected return helps in planning and setting realistic performance goals, while understanding risk (volatility) is crucial for assessing whether a portfolio’s return is adequate for its risk. These calculations also underpin portfolio optimization and the 21

trade-off between risk and return (the efficient frontier concept) . In practice, you should be comfortable computing these to evaluate different investment combinations.

**Instructional Resources**

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*Step-by-Step Guide:* **Wall Street Prep – Expected Return** [7] – Explains how to calculate expected returns for a portfolio with examples, including an Excel template. It shows both the formula approach and using functions to compute weighted averages.

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*Video Walkthrough:* **YouTube – Portfolio Risk & Return (Step by Step)** – A tutorial demonstrating

how to calculate a portfolio’s expected return and standard deviation by hand and in Excel. It often uses a two-asset example and builds up to more assets, illustrating the diversification effect (search

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for titles like “Portfolio Risk and Return in Excel”). A specific example: *AnalystPrep’s* **Portfolio Risk and Return** video covers the calculations in a CFA context.

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*Text & Examples:* **Financial Edge – Expected Returns** [8] – Provides clear definitions and worked

examples of computing expected returns, plus some intuition on variance. It might also discuss using historical data (mean of past returns) versus forward-looking estimates.

**Example**

**Suppose a portfolio has two assets:**

Asset A: 60% weight, expected return 12%

Asset B: 40% weight, expected return 8%

**Expected Portfolio Return:**

$$ E(R) = 0.6 \times 12\% + 0.4 \times 8\% = 7.2\% + 3.2\% = 10.4\%. $$

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The portfolio should return **10.4%** on average .

**Portfolio Risk (Standard Deviation) – additional info:** If Asset A’s standard deviation is 15%, Asset B’s is 10%, and their correlation is 0.5, we can calculate the portfolio’s standard deviation. First find the variance:

$$ \sigma\_p^2 = (0.6^2)(0.15^2) + (0.4^2)(0.10^2) + 2(0.6)(0.4)(0.5)(0.15)(0.10). $$ Compute each term:

– $0.6^2 \* 0.15^2 = 0.36 \* 0.0225 = 0.0081$

– $0.4^2 \* 0.10^2 = 0.16 \* 0.01 = 0.0016$

– Covariance term: $2 \* 0.6 \* 0.4 \* 0.5 \* 0.15 \* 0.10 = 2 \* 0.6 \* 0.4 \* 0.5 \* 0.015 = 2 \* 0.0018 = 0.0036.$

Sum: $\sigma\_p^2 = 0.0081 + 0.0016 + 0.0036 = 0.0133.$ Thus, $\sigma\_p = \sqrt{0.0133} \approx 11.53\%.$

**Interpretation:** The portfolio’s standard deviation (~11.5%) is lower than the weighted average of the assets’ stdevs (which would have been 13% if simply 0.6*15% + 0.4*10%). This illustrates risk reduction through diversification (because the assets aren’t perfectly correlated).

**Practice Problems**

1.

**Expected Return (Portfolio):** You have a portfolio of three stocks with the following weights and

expected returns: 30% in Stock X (expected 10%), 50% in Stock Y (5%), 20% in Stock Z (20%). Calculate the portfolio’s expected return. *(Multiply each weight by the return and sum up.)*

2.

**Portfolio Standard Deviation:** Two assets have standard deviations of 8% and 12%, with a

correlation of 0. If you invest half in each, what is the portfolio’s standard deviation? *(Hint: If correlation is zero, the covariance term drops out. Calculate using the formula.)*

3.

**Diversification Thought:** Given the result in question 2, compare the portfolio’s risk to the simple

average of 8% and 12%. What does this tell you about diversification?

4.

**Covariance Effect:** Asset A and B each have variance 0.04 (i.e., 20% stdev). If you put 50/50 in each, find the portfolio variance when their correlation is (a) 1.0 (perfectly positive), (b) 0.0 (uncorrelated), (c) –0.5 (negatively correlated). *(This will show the range of possible portfolio risks.)*

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**3. Investment Returns (Including Bonds)**

**Key Concepts**

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**Total Return:** The overall return on an investment, including all income and price changes. For a stock, total return would include dividends **plus** any change in the stock’s price. For a bond, total return includes interest payments (coupons) **plus** the change in the bond’s price. It can be expressed as a percentage of the initial investment: $$ \text{Total Return} = \frac{\text{Income Received} + (\text{Ending Value} - \text{Beginning Value})}{\text{Beginning Value}} \times 100\%. $$ This measure is also called **holding period return (HPR)** when referring to the return over the specific period you held the investment. For example, if you buy at $P\_0$, receive cash $C$ during, and end at price $P\_1$, then $ \text{HPR} = \frac{P\_1 + C - P\_0}{P\_0}$. In practice, use HPR for any period (could be <1 year or >1 year), and note it can be annualized if needed.

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**Bond Yield Measures:** Bonds have several yield metrics to understand returns: •

**Current Yield:** A quick snapshot of a bond’s annual income relative to its price. It is calculated as the 22

annual coupon payment divided by the bond’s current market price . For example, if a bond’s face value is \$1,000 with a 6% coupon, it pays \$60/year. If its current market price is \$950, the current yield = 60 / 950 ≈ 6.32%. This measure looks only at income portion, ignoring any price change or repayment of principal.

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**Yield to Maturity (YTM):** The **total expected return** of a bond if held until it matures . YTM is essentially the bond’s internal rate of return, considering all coupon payments *and* the repayment of 23

face value at maturity, relative to the current price . It’s the discount rate that equates the present value of all future cash flows (coupons + principal) to the bond’s price. YTM accounts for the time value of money and assumes coupons are reinvested at that same rate. It’s typically expressed as an annual percentage. A bond selling at a discount will have YTM > current yield > coupon rate; at a 24

premium, YTM < current yield < coupon rate .

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**Holding Period Return (for bonds):** If you sell a bond before maturity, your actual return is the

holding period return, which could differ from the YTM. **YTM vs HPR:** YTM is what you’d earn by 25

holding to maturity , whereas HPR is what you *actually* earn over the period you hold the bond (which could be shorter). If interest rates change or you sell early, HPR will reflect price changes; YTM at purchase assumes you don’t sell. For a bond investor who may trade, HPR is the realized return. *Example:* If you buy a bond at \$1,000 and one year later the bond’s price is \$980 and you got \$50 interest, your one-year HPR = (980 + 50 - 1000) / 1000 = 3%. The original YTM when you bought might have been different, but 3% is what you actually earned in that year.

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**Realized vs. Expected Returns:** Be aware that yield measures like YTM are quoted assuming certain

conditions (e.g., held to maturity, reinvestment of coupons). The actual realized return (HPR) can differ if those conditions aren’t met or if market yields change. Also, **nominal vs real return:** nominal is before inflation; real = nominal - inflation (approx).

**Why these concepts matter:** Being able to compute returns is fundamental to evaluating investments. For example, if you’re considering buying a bond, you should understand the difference between the coupon rate, the current yield, and the yield to maturity – each gives different information. Similarly, calculating holding period returns tells you how well an investment actually performed for you. These are common tasks in finance roles and on exams, and misunderstanding them can lead to poor investment decisions.

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**Instructional Resources**

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*Explainer:* **FINRA – Understanding Bond Yields and Return** [9] – A clear guide from FINRA that explains different bond yield measures (nominal yield, current yield, YTM) and how to calculate returns for bonds in various scenarios. It also touches on how bond prices move opposite to yields. •

*Step-by-Step Examples:* **AnalystPrep – Bond Yields and Return Calculations** [10] – This resource (or similar study notes) walks through calculating current yield, YTM, and holding period return with examples. It’s useful for seeing the formulas in action and includes special cases (e.g., semiannual coupons, callable bonds).

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*Video Tutorial: Investopedia Video – Bond Yields (Current Yield vs YTM)* – (If available, as referenced in

search results) a video explaining the difference between current yield and YTM with visual examples.

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*Practice Problems:* Websites like thismatter.com or instructor notes that include practice on “Given a bond’s price and coupon, find YTM” and vice versa are valuable. Use a financial calculator or Excel’s RATE function to practice solving for YTM (since the YTM formula often requires iteration).

**Example**

**You buy a bond for \$950, it pays \$50 in coupons over the year, and by the end of one year the bond’s price is \$980. What is your one-year return?**

**Solution:** Your beginning price $P\_0 = \$950$. Income = \$50. Ending price $P\_1 = \$980$. Plug into the holding period return formula:

$$ \text{Return} = \frac{(P\_1 + \text{Income}) - P\_0}{P\_0} = \frac{(980 + 50) - 950}{950}. $$ $$ \text{Return} = \frac{30 + 50}{950} = \frac{80}{950} \approx 0.0842 = 8.42\%. $$ So your total return is about **8.4%** for that year. This includes ~3.16% from price appreciation ($30 on $950) and ~5.26% from coupon income ($50 on $950).

*Analysis:* If the bond’s YTM was, say, 6% when you bought, your realized 8.4% is higher because the bond’s price rose (perhaps due to interest rates falling). Conversely, if prices had fallen, your HPR could be lower than the YTM.

**Practice Problems**

1.

**Bond Holding Period Return:** You purchase a bond at \$1,000 (par) that pays \$30 every six months

(so \$60/year in coupons). One year later, its market price is \$1,020. What was your holding period return for that year? *(Hint: Include the two coupon payments and the price change. Answer should be around 8%+.)*

2.

**Current Yield:** A \$1,000 face value bond has a 5% annual coupon (paid annually) and is currently selling for \$1,200. What is the current yield? *(Coupon = \$50/year. Current yield = 50 / 1200 = 4.17%.)* 3.

**Yield to Maturity (conceptual):** A bond’s current yield is 4% and its price is below par. Is the YTM higher or lower than 4%? Why? *(If price < par, coupon/price gives a current yield > coupon rate; YTM will be even higher because the bond will also gain value as it moves to par at maturity. So YTM > current yield in this case.)*

4.

**Yield Calculations (advanced):** Given a 3-year bond with 5% annual coupons, face value \$1000, and current price \$970, estimate the YTM. *(This can be solved via trial-and-error or Excel RATE function. It should be slightly above 5% since price is a bit below par.)*

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**4. Balance Sheet Components and Account Classification Key Concepts**

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**Balance Sheet Structure:** The balance sheet is an accounting snapshot of a company’s financial

position at a point in time. It adheres to the **accounting equation:**

$$ \text{Assets} = \text{Liabilities} + \text{Shareholders’ Equity}. $$

This means everything the company owns (assets) is financed either by borrowing (liabilities) or by 26

owners’ claims (equity). It must always balance .

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**Assets:** Resources the company owns or controls that are expected to provide future economic benefit. Assets are **classified** as:

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**Current Assets:** Assets likely to be converted to cash or used up within one year (or one operating 27

cycle, if longer) . These include cash, accounts receivable, inventory, short-term investments, and 28

prepaid expenses. They are listed in order of liquidity (how quickly they can be turned into cash) .

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**Non-Current Assets (Long-Term Assets):** Assets that are not expected to turn into cash within one

year. Examples: property, plant & equipment (PP&E) like equipment and buildings; long-term investments; intangible assets (patents, goodwill). These provide benefits over multiple years. Depreciation or amortization is applied to many long-term assets to spread their cost over their useful life.

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**Liabilities:** Obligations of the company – amounts the company owes to creditors/suppliers/lenders. Like assets, classified by timeframe:

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**Current Liabilities:** Obligations due to be settled within one year . Examples: accounts payable, short-term loans, accrued expenses (like wages payable, taxes payable), and unearned revenue (payments received in advance for goods/services not yet delivered – a liability until you deliver).

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**Long-Term Liabilities (Non-Current Liabilities):** Debts due in over a year . Examples: long-term loans, bonds payable, deferred tax liabilities, long-term lease obligations. These represent the company’s long-term financing and obligations.

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**Equity (Shareholders’ Equity):** The owners’ residual interest in the assets after liabilities are paid. Equity includes:

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**Common Stock (and Preferred Stock if any):** The par value (and any additional paid-in capital) from shares that owners have invested.

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**Retained Earnings:** Cumulative net income that has been retained in the business (not paid out as

dividends). This increases with profits and decreases with losses or dividends. Essentially, retained earnings are the portion of equity generated by the business operations over time. •

**Treasury stock:** (if applicable) shares that the company repurchased, shown as a negative equity. •

**Other**: Items like accumulated other comprehensive income, etc., if relevant. •

**Account Classification Examples:** It’s important to know which accounts fall into which category: •

*Assets:* Cash (current asset), Accounts Receivable (current asset), Inventory (current asset), Prepaid expenses (current asset), Equipment (non-current asset), Land (non-current), Goodwill (non-current intangible).

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*Liabilities:* Accounts Payable (current liability), Short-term Notes Payable (current), Accrued Expenses (current), Unearned Revenue (current), Long-term Debt such as Bonds Payable (long-term liability), Mortgage payable (long-term).

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*Equity:* Common Stock, Preferred Stock, Additional Paid-in Capital, Retained Earnings (all equity). Below is an example table illustrating some accounts and their classifications:

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| **Account Classification** |
| --- |
| Cash Asset – Current |
| Accounts Receivable Asset – Current |
| Inventory Asset – Current |
| Prepaid Rent Asset – Current |
| Equipment Asset – Non-current (PP&E) |
| Accounts Payable Liability – Current |
| Short-term Loan Liability – Current |
| Bonds Payable Liability – Long-term |
| Deferred Revenue Liability – Current (unearned income) |
| Common Stock Equity (Paid-in Capital) |
| Retained Earnings Equity (Retained Profit) |

**Why these concepts matter:** For the exam (and in finance roles), you need to know not just definitions, but how to quickly classify items on financial statements. For instance, if given a list of accounts, you should identify what goes where on the balance sheet. Understanding the balance sheet is also foundational for analyzing a company’s liquidity and leverage (see ratio analysis below). Moreover, misclassification can lead to errors in financial analysis (e.g., treating a long-term loan as current can misstate liquidity measures).

**Instructional Resources**

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*Comprehensive Guide:* **Investopedia – Balance Sheet Components** [11] – Breaks down each section of the balance sheet (assets, liabilities, equity), with common line items and explanations. Helpful for reviewing the purpose of each category and examples of accounts.

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*Interactive Template:* **Wall Street Prep – Balance Sheet** [12] – Provides a template of a balance sheet and guides you through populating it, which is useful for understanding how each account fits. Also covers how the balance sheet links with other statements (e.g., retained earnings link from the income statement).

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*Video:* **Beginners’ Guide to the Balance Sheet** (YouTube) – There are good videos (e.g., by

accounting professors or channels like AccountingCoach) that visually walk through a sample balance sheet, explaining each item and common classifications.

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*Exercises:* Many textbooks and online resources have classification exercises (e.g., classifying a list of accounts). AccountingCoach [19] might have quizzes for practice. Also, consider looking at a real company’s balance sheet to identify each line item’s category.

**Example**

Consider the accounts listed in the table above. If you were building a balance sheet, you would place each account into the Assets, Liabilities, or Equity section, and further distinguish current vs long-term. For instance, **Inventory** is an asset, and because inventory is expected to be sold within a year, it’s a current

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asset. **Bonds Payable** (a debt that might be due 10 years from now) is a liability, specifically a long-term liability since it’s not due within the next year.

One way to check yourself is to ask: *“Will this item be used or due within 12 months?”* If yes, it’s current (for assets or liabilities accordingly); if not, it’s long-term. Equity items are by nature neither current nor long term (they remain until changed by further transactions like earnings or issuing stock).

**Practice Problems**

1.

**Classify Accounts:** For each of the following, identify the proper balance sheet classification: **Prepaid Insurance**, **Notes Receivable (due in 2 years)**, **Unearned (Deferred) Revenue**, **Accumulated Depreciation**, **Preferred Stock**. *(Prepaid Insurance – Current Asset; Notes Receivable due in 2+ years – Non-current Asset; Unearned Revenue – Current Liability (usually, if will be earned <1 year); Accumulated Depreciation – it’s a contra-asset (attached to PPE, reduces assets); Preferred Stock – Equity.)*

2.

**Build a Mini Balance Sheet:** Imagine a small business has: Cash \$5,000; Accounts Receivable \

$2,000; Equipment \$10,000; Accounts Payable \$3,000; Long-term Loan \$5,000; Common Stock \ $1,000; Retained Earnings \$8,000. Organize these into a balance sheet. Does Assets = Liabilities + Equity? *(Assets: Cash 5k + AR 2k + Equipment 10k = 17k total. Liabilities: AP 3k + Long-term Loan 5k = 8k. Equity: CS 1k + RE 8k = 9k. Liabilities (8k) + Equity (9k) = 17k, which matches Assets 17k. Balances!)*

**5. Interaction Between Income Statement and Balance Sheet Key Concepts**

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**Net Income flows to Retained Earnings:** The **income statement** and **balance sheet** are connected

through earnings. Specifically, net income from the income statement (after expenses, taxes, etc.) 31

gets added to equity on the balance sheet via the **Retained Earnings** account . If the company pays dividends, those dividends are subtracted from net income before adding to retained earnings (since dividends are a distribution of earnings). In formula form:

**Ending Retained Earnings = Beginning Retained Earnings + Net Income - Dividends.** For example, if a company earns \$100,000 net income in the period and pays \$20,000 in dividends, 31

retained earnings will increase by \$80,000 . This linkage means each period’s profit boosts the company’s equity (assuming it’s retained). Conversely, a net loss or dividends decrease retained earnings (and thus equity). This is how the **profitability** of a company (income statement) affects its **financial position** (balance sheet) directly.

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**How transactions flow between statements:** Any transaction that affects the income statement

will in turn affect the balance sheet:

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**Revenues** increase net income, which increases retained earnings (equity), *and* often correspond to

an increase in an asset (e.g., selling on credit increases Accounts Receivable) or decrease in a liability (e.g., unearned revenue is fulfilled).

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**Expenses** decrease net income, which decreases retained earnings, *and* often correspond to either a

decrease in an asset (using up cash or inventory) or increase in a liability (incurring wages payable, etc.).

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**Depreciation Expense:** This is a classic example that ties the statements. Depreciation is an expense

on the income statement (reducing net income and retained earnings) and also reduces the book value of assets on the balance sheet through **Accumulated Depreciation** (a contra-asset account)

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. So when you record depreciation, you debit Depreciation Expense (I/S) and credit Accumulated

Depreciation (B/S), illustrating the connection. •

**Using Retained Earnings:** If a company has a net loss, retained earnings will decline. If it pays dividends, that does not show up on the income statement but *does* reduce retained earnings (on the balance sheet and in the Statement of Retained Earnings). This is why dividends are often said to be “paid out of retained earnings.”

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**Connecting the Dots (Practical view):** You can think of it this way: over an accounting period, the income statement measures performance (net income). After closing the books for that period, the net income is transferred to the balance sheet (equity). This is why the balance sheet date is the *end* 33 31

*of the income statement period* . The balance sheet “rolls forward” with retained earnings updated by that period’s profit.

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**Other statement interactions:** (Beyond the exam’s main ask, but for completeness) The **Cash Flow Statement** also connects, using information from both I/S and B/S (e.g., it reconciles beginning and ending cash, and uses net income as a starting point for operating cash flow). But the key focus here is I/S to B/S via retained earnings.

**Why these concepts matter:** This is often tested conceptually. For example, an exam question might give an income statement and part of a balance sheet and ask you to fill in missing retained earnings, or ask what happens to equity if net income is X and dividends are Y. It’s crucial to understand this flow to avoid mistakes like counting net income twice or forgetting dividends. It also underpins how **financial models** are built – when forecasting, you ensure that net income flows into the balance sheet to keep it balanced. Additionally, knowing this helps you understand how *temporary* accounts (revenues/expenses) close into *permanent* accounts (equity).

**Instructional Resources**

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*Visual Guide:* **Reach Reporting – Financial Statement Interconnections** [13] – Uses diagrams to

show how the financial statements link together. It highlights the flow of net income into retained earnings and other connections (like depreciation flowing to accumulated depreciation, etc.). •

*Linking Guide:* **Wall Street Prep – Financial Statements Linkages** [14] – A step-by-step walkthrough of building a simple three-statement model, illustrating exactly how net income feeds into retained earnings and how changes in balance sheet accounts tie to cash flow statement. The initial part of that guide focuses on the I/S to B/S link.

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*Quick Tutorials:* There are YouTube videos (e.g., “How the 3 Statements Link” by Wall Street Prep , or others by professors) that specifically demonstrate the net income to retained earnings link and give examples (like a mini case of a company earning money and paying dividends and showing the effect on all statements).

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*Accounting Text Excerpt:* Any basic accounting textbook or reference (even AccountingCoach [19]) will have a section on closing entries and how net income impacts equity. If you find “closing the books” topics, that’s essentially showing this flow.

**Example**

**If a company earns $100,000 in net income during the year and pays $20,000 in dividends:**

– On the **Income Statement**, net income is $100,000.

– On the **Statement of Retained Earnings** (or as part of equity section): start with beginning retained earnings, add $100,000 net income, subtract $20,000 dividends, equals the ending

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retained earnings.

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– On the **Balance Sheet**, the retained earnings in equity will increase by the net $80,000 . So if beginning retained earnings was, say, $500,000, the ending retained earnings becomes $580,000. This $80,000 is the portion of earnings kept in the company, boosting equity. **Depreciation Example:** Suppose depreciation expense for the year is $5,000. This will reduce net income by $5,000 on the income statement (and thus reduce retained earnings by $5,000). On the balance sheet, accumulated depreciation will increase by $5,000, which reduces the net book value of assets. The $5,000 expense *“flows”* into the balance sheet via two routes: it lowers an asset (through accumulated depreciation) and lowers equity (through retained earnings via net income). Yet, note that depreciation does **not** use cash in the period – this is where the cash flow statement would add back depreciation. But from an I/S and B/S perspective, the connection is as described.

**Practice Problems**

1.

**Retained Earnings Calculation:** A company had retained earnings of \$1,000,000 at the beginning

of the year. During the year, it earned net income of \$120,000 and paid out \$30,000 in dividends. What is retained earnings at year-end? *(Begin RE 1,000,000 + NI 120,000 - Div 30,000 = \$1,090,000).*

2.

**Effect of Net Loss:** If instead the company had a **net loss** of \$50,000 and paid no dividends, what

happens to retained earnings? *(It would decrease by 50,000. E.g., begin 1,000,000 + (-50,000) = \ $950,000 end retained earnings.)*

3.

**Depreciation Impact:** Explain how a \$10,000 depreciation expense affects (a) the income

statement, (b) the balance sheet. *(I/S: increases expense, so lowers net income by \$10k (assuming 0 tax for simplicity). B/S: accumulated depreciation increases by \$10k (reducing assets), retained earnings in equity decreases by \$10k due to lower net income. No change in cash directly from this entry.)* 4.

**Accrued Expense Impact:** Your company incurred \$5,000 of utilities expense in the last week of December which it will only pay in January, and it wasn’t yet recorded. What adjusting entry connects I/S and B/S here? What is the effect on net income and liabilities? *(You’d record an expense \$5,000, reducing net income (and retained earnings) by \$5k, and record Utilities Payable (a current liability) \$5k on the balance sheet. This links the statements: an incurred expense that’s unpaid shows up as a liability.)*

**6. Use of Excel for Quantitative Calculations**

**Key Concepts**

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**Financial Functions in Excel:** Excel (and Google Sheets) provides built-in functions that make

finance calculations faster and more accurate. Key functions to know:

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PV(rate, nper, pmt, [fv], [type]) – calculates the present value of a series of cash flows.

You supply the discount rate, number of periods, payment each period (if an annuity), and an optional future value (if a lump sum at end). The [type] is 0 or 1 indicating payments at period end or beginning. *(Note: For a single future amount, you can set pmt=0 and just use FV.)*

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FV(rate, nper, pmt, [pv], [type]) – calculates future value given inputs (similar structure

to PV).

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PMT(rate, nper, pv, [fv], [type]) – computes the periodic payment required for a loan or

annuity given present value (or loan amount) and other parameters. This is very useful for loan amortization problems (e.g., find the monthly payment on a mortgage).

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NPV(rate, value1, [value2]...) – calculates net present value of a series of cash flows

occurring at regular intervals, discounted at the given rate. Important: Excel’s NPV assumes the first value is one period from now; if you have a cash flow at time 0, you often add it separately. There’s also XNPV for irregular dates.

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IRR(values...) – calculates the internal rate of return for a series of cash flows. Great for

checking your work on IRR problems (like capital budgeting).

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**Statistical Functions:** AVERAGE(range) will compute the mean (e.g., average return over several periods). STDEV.S(range) or STDEV.P(range) computes sample or population standard deviation of a range (useful for calculating volatility of returns from historical data). These can help in portfolio risk calculations if you have return time series.

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Other potentially useful ones: RATE (solve for interest rate given PV, payment, etc.), NPER (solve for number of periods), EFFECT (effective annual rate given nominal and compounding), and basic math functions.

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**Modeling Templates:** Setting up Excel **templates or models** for common problems can speed up

your calculations:

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**Time Value Templates:** For example, create a timeline of cash flows in one row, and in the next row calculate the present value of each (using either formulas or PV for each flow). Sum them to get NPV.

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**Amortization Schedule:** Build a loan amortization table with columns for payment number, beginning balance, interest, principal, ending balance. Use PPMT and IPMT functions or manual formulas to split payment into principal and interest. This helps answer questions like “loan balances over time” (Practice Problem 2 below).

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**Portfolio Calculators:** You can use Excel to calculate portfolio expected return and variance. For

instance, list asset weights and returns in columns and use SUMPRODUCT for expected return; use matrix multiplication (MMULT) for variance with a covariance matrix (for advanced users).

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**Ratio Analysis Sheets:** Input financial statement data and use formulas to compute liquidity ratios,

leverage ratios, etc., which helps practice interpreting them quickly.

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**Accuracy and Speed:** Practicing in Excel not only saves calculation time but also reinforces understanding. For example, using the NPV function can confirm your manual discounting. Using IRR can check your guess on an IRR problem. Just be careful to understand what the functions are doing (Excel might have slightly different conventions in some cases, e.g., NPV as noted). Many exam-takers quickly set up a rough calc in Excel to verify answers since the ACF exam allows outside resources.

**Why these concepts matter:** In modern finance roles (and even exams if resources are allowed), Excel is the go-to tool for computations. Knowing the right functions means you can solve complex problems in 35

seconds (and double-check manual work). The ACF exam is online and open-resource , so being skilled with Excel can be a huge advantage in solving quantitative questions quickly and accurately. For instance, rather than doing trial-and-error on an IRR problem, you could plug the cash flows into IRR() and get the answer. Moreover, familiarity with Excel functions is expected in finance jobs.

**Instructional Resources**

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*Video Course:* **YouTube – Excel for Finance & Accounting** [15] – A full-length free video (often a

couple of hours) that covers essential Excel skills and functions for finance. It goes through examples of using PV, FV, PMT, NPV, IRR, etc., as well as tips on Excel best practices (like anchoring cells, using absolute references in formulas).

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*Spreadsheet How-To:* **Using Excel Spreadsheets for TVM** [6] – An article or e-book (possibly a Journal of IT for Finance piece) that demonstrates time value of money calculations in Excel. It shows how to set up formulas for present value, future value, and compares doing it by hand vs using built-in functions.

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*Personal Finance in Excel:* **YouTube – Excel for Personal Finance** [16] – A shorter video focusing on personal finance calculations (which are essentially TVM problems: loans, savings, investments). It provides practice in using functions like PMT for loan payments or planning retirement savings using FV, etc.

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*Excel Templates & Practice:* Websites like *Corporate Finance Institute (CFI)* offer free Excel templates for NPV/IRR or ratio analysis. You can download those and play with scenarios. Also, try to replicate examples from your study manually in Excel – e.g., recreate the bond return example to verify the calculation or create a small model to link net income to retained earnings.

**Example**

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**Loan Payment in Excel:** Suppose you need to find the annual payment on a \$15,000 loan at 7%

interest for 4 years (a problem from earlier). Instead of trial-and-error, use Excel’s PMT function: =PMT(0.07, 4, -15000)

Excel will return the annual payment (the negative sign for 15000 is because that’s the amount *borrowed* – a cash inflow – so payments come out as negative by convention). The result would be **\ $4,510.26** (approximately) per year. This matches what you’d get solving the annuity formula manually.

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**Present Value of Multiple Cash Flows:** If you have cash flows: Year 1: \$1,000; Year 2: \$1,000; Year

3: \$1,000; discount rate 6%. In Excel you could lay them out and do:

=NPV(0.06, 1000, 1000, 1000)

However, note that Excel’s NPV assumes those \$1,000 are end of Year 1, 2, 3. The result here would be the total PV. Alternatively, discount each: =1000/(1.06)^1 + 1000/(1.06)^2 + 1000/ (1.06)^3 to verify. Excel can do either approach.

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**Average and Stdev:** If you have a range of historical annual returns in cells A2:A11, =AVERAGE(A2:A11) gives the mean return, and =STDEV.S(A2:A11) might give sample standard deviation (if those 10 data points are a sample). This can help estimate an asset’s risk/ return profile quickly.

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**Check Your Work:** After calculating an IRR manually, you might use =IRR(range\_of\_cashflows) to see if you got it right. E.g., for a project with initial outlay -\$100 and inflows \$40, \$50, \$60 in years 1,2,3: =IRR({-100,40,50,60}) yields about 15.2%. This can be much faster than solving the cubic equation by hand!

**Practice Problems**

1.

**Present Value in Excel:** Use Excel to calculate the present value of receiving \$1,000 at the end of

each year for 5 years, assuming a discount rate of 6%. *(Use either NPV or the PV function for an annuity.* 13

*You can also verify by summing individual PVs. The answer should be PV = \$4,212.36 if it’s an ordinary annuity.)*

2.

**Loan Amortization Table:** Create a small amortization table in Excel for a 3-year loan of \$12,000 at

5% annual interest with annual payments. List year, beginning balance, interest (5% of beg balance), payment (use PMT to find this), principal paid (payment - interest), and ending balance. What is the annual payment and what is the ending balance after 3 years? *(Payment should be \$4,374.11; ending balance after year 3 should be \$0 if done correctly. You can check each year’s balance decreases properly.)*

3.

**Portfolio Return in Excel:** If you have stock returns in one column and a corresponding column of

portfolio weights, write an Excel formula to compute the portfolio’s expected return in one cell (hint: use SUMPRODUCT). Also, if you have a variance-covariance matrix for three assets and their weights, how could you compute portfolio variance using matrix operations or the SUMPRODUCT approach?

*(This is more advanced: answer would mention using MMULT or expanding the variance formula manually.)*

4.

**Experiment:** Pick any complex finance problem (like computing IRR, or bond price given YTM) and

try using Excel functions to solve it. For example, given a bond with face \$1000, 5% coupon, 10-year maturity, and YTM 4%, what’s the price? You can use =PV(0.04,10,50,1000) (assuming annual coupons of \$50) to get the price (which should be above \$1000 since YTM < coupon). This kind of practice solidifies both finance knowledge and Excel skills.

**Additional Topics That May Be Covered**

*(These topics have been mentioned as “may be covered,” so it’s wise to review them for completeness.)* **Annuities and Perpetuities**

**Key Concepts**

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**Annuity:** A series of equal cash flows paid at regular intervals for a fixed period. Examples include loan payments, rent, or bond coupon payments. If the payments occur at the end of each period, it’s an **ordinary annuity**. If at the beginning, it’s an **annuity due** (which is slightly more valuable, because each payment comes one period sooner). Annuities are characterized by a payment amount (PMT), number of periods (n), and interest rate (r). For example, receiving \$200 every year for 10 years is an annuity.

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**Perpetuity:** An infinite stream of equal cash flows, with no end date. A classic example is **preferred**

**stock dividends** (in theory, paying a fixed dividend forever) or a trust fund that is supposed to pay out a fixed amount indefinitely. Because the payments never end, you can’t use the annuity formula directly as n → ∞, but there is a simplified formula.

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**Present Value Formulas:** These formulas let you calculate the lump-sum value today of these

streams of payments:

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**Present Value of an Ordinary Annuity:** $$ PV\_{\text{annuity}} = PMT \times \frac{1 - (1+r)^{-n}}{r}, $

$ where *PMT* is the payment each period, *r* is the period interest (or discount) rate, and *n* is the number of payments. This formula essentially sums $PMT/(1+r)^t$ from $t=1$ to $n$. *(This formula assumes the first payment is one period from now; for annuity due, multiply this PV by (1+r) to account for earlier payments.)*

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**Present Value of a Perpetuity:** $$ PV\_{\text{perpetuity}} = \frac{PMT}{r}, $$ assuming the first

payment is one period away. This surprisingly simple formula comes from the fact that the series 14

$PMT/(1+r)^t$ forever converges to that value. For example, \$10,000 per year forever at 4% is worth $10,000/0.04 = \$250,000$ today. *(If the perpetuity payments start immediately (i.e., today), then it’s like an annuity due version of perpetuity, and PV would be $\frac{PMT}{r} \times (1+r)$, since you’re getting an extra period of value.)*

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**Growth** (mention if relevant): A **growing perpetuity** has payments that grow at rate g. Its PV formula is $PMT\_{1}/(r-g)$ (first payment over difference between discount rate and growth). But if not explicitly required, focus on level perpetuities.

**Why these concepts matter:** Annuities and perpetuities are building blocks in finance. Many finance problems reduce to these formulas – loans (like mortgages or car loans) are annuities, valuations of perpetuities underlie stock valuation (a stock that pays constant dividends can be valued as a perpetuity), etc. Understanding these also helps in not having to sum many terms manually. Plus, placement exams often directly test the ability to apply or derive these formulas (e.g., “what is PV of \$X a year for Y years at Z%?” or conceptual questions like “if the interest rate decreases, what happens to the value of a perpetuity?”).

**Instructional Resources**

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*Study Guide:* **Fiveable – Annuities and Perpetuities** [17] – A student-friendly summary of these concepts, with definitions and simple examples. It clearly differentiates an annuity from a perpetuity and provides the formulas in an easy-to-understand way (e.g., “Annuities are equal payments over a 36

fixed period, while perpetuities are annuities that continue forever” ).

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*Video Tutorial:* **YouTube – Perpetuities & Annuities** [18] – A video (often by professors or educational

channels) that walks through example problems like calculating the PV of lottery winnings paid as an annuity, or comparing a lump sum to an annuity. Seeing the step-by-step on how the formulas are derived or used can solidify understanding.

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*Practice Problems:* Look for finance textbooks or online worksheets that include annuity and perpetuity problems. For instance, *Investopedia* and *WallStreetPrep* often have example problems such as “Would you rather receive \$X per year for N years or \$Y today? Calculate which is better at a given discount rate.” These require using the annuity formula to compare to a lump sum.

**Practice Problems**

1.

**Annuity PV:** What is the present value of receiving \$200 at the end of each year for 10 years, at a discount rate of 5%? *(Use the annuity formula: $PV = 200 \times \frac{1 - 1.05^{-10}}{0.05}$. Compute that: $1.05^{-10} \approx 0.6139$, so numerator $= 1 - 0.6139 = 0.3861$. Divide by 0.05 gives $7.722$. Times 200 gives \$1,544.40 (approximately).)*

2.

**Perpetuity PV:** A scholarship endowment promises to pay \$10,000 annually *forever*, starting one

year from now. If the university’s discount rate is 4%, how much is this endowment worth today? *(Using the perpetuity formula: $PV = 10000 / 0.04 = \$250,000$.)*

3.

**Compare Options:** You win a small lottery that gives you two choices: (a) \$50,000 lump sum now, or (b) \$6,000 per year for 10 years (first payment in one year). If your personal discount rate is 6%, which option has a higher present value? *(Calculate option b as an annuity: $PV = 6000 \times \frac{1 - 1.06^{-10}}{0.06} \approx \$44,221$. Compare to \$50,000 now. \$50k is higher, so take the lump sum.)* 4.

**Annuity Due:** (If you want extra challenge) If the \$6,000 per year in option (b) above was *starting immediately* (an annuity due), how would that change the PV? *(For annuity due, multiply the ordinary annuity PV by (1+0.06). So PV due = \$44,221 \* 1.06 ≈ \$46,875. Still below \$50k.)*

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**Basic Ratio Analysis Key Concepts**

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**Liquidity Ratios:** These measure a firm’s ability to meet short-term obligations.

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**Current Ratio:** = Current Assets / Current Liabilities . It indicates how many dollars of current assets the company has for each dollar of current liabilities. For example, a current ratio of 2.0 means current assets are twice current liabilities, suggesting a comfortable liquidity buffer. A ratio < 1 is a warning sign (more debts due soon than assets to cover them). However, extremely high current ratio could indicate inefficient use of resources.

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**Quick Ratio (Acid-Test):** = (Current Assets – Inventory – *possibly other less liquid current assets*) / 38

Current Liabilities . This is a more stringent test of liquidity than current ratio because it excludes inventory (and sometimes prepaid expenses) on the assumption that not all current assets are equally liquid. The formula is often (Cash + Marketable Securities + Receivables) / Current Liabilities. A quick ratio of 1.0 means even without selling inventory, the company can cover current obligations.

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*Note:* The difference between current and quick ratio is inventory and other less liquid items – if a company has a lot of inventory that might not be quickly convertible to cash, the quick ratio gives a clearer picture of short-term liquidity.

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**Leverage (Solvency) Ratios:** These assess long-term financial stability and how much debt the

company uses.

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**Debt-to-Equity Ratio:** = Total Liabilities / Total Shareholders’ Equity. This indicates the relative

proportion of financing coming from creditors vs. owners. For instance, a D/E of 1.5 means the company has \$1.50 of debt for each \$1 of equity. Higher D/E means more leverage (more debt relative to equity). Industries differ, but a very high D/E can signal risk if earnings falter (as debt payments are fixed obligations).

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**Debt-to-Assets Ratio:** = Total Liabilities / Total Assets. This tells what fraction of assets is financed by

debt. For example, 0.4 (or 40%) means 40% of the company’s assets are funded via liabilities, the rest via equity (since Assets = Liab + Equity, debt-to-assets is L/A and equity-to-assets would be E/A = 60% in this case). A higher debt-to-assets means more obligations relative to resources.

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*Variations:* Sometimes “debt” might be considered as only interest-bearing debt (excluding accounts

payable, etc.) depending on context. But in a simple exam context, assume total liabilities includes all debts.

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**Other Ratios (just in case):** The prompt specifically mentions liquidity and leverage. There are also profitability ratios (like net profit margin, ROE) and efficiency ratios (like asset turnover), but if not explicitly mentioned, focus on liquidity & leverage for now.

**Why these concepts matter:** Ratio analysis is a fundamental tool for evaluating financial health. For the placement exam, you should be comfortable calculating these basic ratios and interpreting them at least qualitatively (e.g., if current ratio is 0.8, that’s generally bad liquidity; if debt-to-equity is 3.0, that’s high leverage, etc.). They could directly ask for a calculation given figures, or a conceptual question like “Company A has current ratio 2, Company B has 1.2, what does that imply?” or “If a company takes a new bank loan (increasing debt and cash), how does that affect current ratio or D/E ratio?” Understanding what each ratio tells you is key.

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**Instructional Resources**

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*Thorough Explanation:* **AccountingCoach – Financial Ratios** [19] – Breaks down various financial

ratios including liquidity and leverage ratios, with clear definitions and examples. It’s a good refresher on not just how to compute, but what values might mean (e.g., what’s a “good” current ratio, caveats like inventory turnover affecting liquidity, etc.).

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*Condensed Guide:* **Datarails – 5 Essential Financial Ratios** [20] – Likely covers current ratio, quick ratio, D/E, and others like net margin or ROA. A quick read that summarizes key ratios every manager should know, which aligns with the exam’s expectation that you know these basics. •

*Interactive Quiz:* Sites like Investopedia have quizzes on ratio analysis where they give a scenario and ask which ratio applies or how to improve a ratio. These can be useful for practice. Additionally, many textbooks include a small case or two companies’ ratios to compare – try to practice interpreting such comparisons.

**Practice Problems**

1.

**Liquidity Ratios:** A company has \$500k of current assets (including \$200k of inventory and \$50k

of prepaid expenses) and \$250k of current liabilities. Calculate the current ratio and quick ratio. *(Current ratio = 500/250 = 2.0. Quick ratio = (500 - 200 - 50) / 250 = 250/250 = 1.0, since we removed inventory and prepaids. This indicates that after removing less liquid assets, the company has \$1 of quick assets for every \$1 of current liability, which is acceptable.)*

2.

**Leverage Ratios:** If total liabilities are \$400k and total equity is \$600k, what is the debt-to-equity

ratio? And if total assets are \$1,000k, what is debt-to-assets? *(D/E = 400/600 = 0.667 (or 66.7%). Debt to-assets = 400/1000 = 0.4 (40%). These indicate the company is funded 2/3 by equity, 1/3 by debt.)* 3.

**Interpreting Changes:** A company’s current ratio was 1.5 last year. This year, they paid off a large amount of accounts payable using cash on hand. All else equal, what happens to the current ratio? *(Paying off AP reduces current assets (cash) and current liabilities (AP) by the same amount. If current ratio was >1, reducing equal amounts of CA and CL will usually increase the current ratio – because the denominator shrinks, and you had a cushion. For example, CA 150, CL 100 (CR=1.5). Pay 20: new CA130, CL80, CR=1.625. So it improves liquidity ratio.)*

4.

**Comparing Companies:** Company X has a D/E of 0.8, Company Y has D/E of 2.0. What might this suggest about their risk profiles or industries? *(X is less leveraged – likely lower financial risk, maybe a more conservative balance sheet. Y is highly leveraged – could be more aggressive growth financed by debt, possibly in an industry like utilities or banking where high leverage is common. Without more context, Y has more debt per equity which could mean higher interest obligations and risk if earnings drop.)*

5.

**Quick vs Current:** A firm has a current ratio of exactly 1.0. Is it possible for its quick ratio to be significantly lower, like 0.5? What would that imply about the firm’s current assets composition? *(Yes, it implies a lot of current assets are tied up in inventory or other non-quick assets. For instance, if current assets = current liabilities, and quick ratio is 0.5, it means half the current assets are inventory/prepaids. That could be a warning that liquidity is weaker than the current ratio suggests.)*

**Simple Capital Budgeting**

**Key Concepts**

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**Net Present Value (NPV):** NPV is the sum of the present values of all cash flows associated with an

investment, **minus the initial investment cost**. In formula terms, for cash flows $CF\_0, CF\_1, ..., 17

CF\_n$ (where $CF\_0$ is often the *initial outflow*, thus negative),

$$ NPV = \sum\_{t=0}^{n} \frac{CF\_t}{(1+r)^t}. $$

More simply, take each future cash flow and discount it back to present, then add them up and subtract any initial cost. An equivalent definition: **NPV = Present value of future cash inflows –** 39

**Present value of cash outflows** . NPV decision rule: accept projects with NPV ≥ 0 (a positive NPV means the project is expected to add value, earning above the discount rate). NPV incorporates the 39

time value of money , and by using a discount rate that reflects risk (often the cost of capital), it properly evaluates profitability.

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**Internal Rate of Return (IRR):** IRR is the discount rate that makes the NPV of a project equal to 40

zero. In other words, IRR is the “break-even” rate of return for the project’s cash flows . If you plug IRR as *r* in the NPV formula, the result will be zero. The decision rule (for independent projects) is usually: accept the project if IRR > required rate of return (or cost of capital). However, be cautious: IRR can be misleading if cash flows are non-normal (e.g., multiple sign changes) or for mutually exclusive projects – that’s beyond simple scenarios but good to know. In straightforward cases, IRR gives the project’s expected return. For example, if a project’s IRR is 12% and your hurdle rate is 10%, the project clears the hurdle (NPV would be positive at 10%). IRR is popular because it gives a percentage return figure, which is intuitively appealing. But always interpret it in context: IRR assumes interim cash flows are reinvested at the IRR, which may not be realistic if IRR is very high. •

**Other considerations:** Simpler methods like **Payback Period** (how long to recover initial investment) or **Profitability Index** (PV of inflows / PV of outflows) exist, but NPV and IRR are the primary ones to master. For “simple” capital budgeting, focus on NPV and IRR mechanics.

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**NPV vs IRR:** Generally, NPV is the more reliable measure (always choose highest NPV when in

doubt), but IRR is useful to know as well. They usually agree on accept/reject decisions for independent projects as long as the cost of capital is below the crossover rate.

**Why these concepts matter:** Capital budgeting is how firms decide on long-term projects (new ventures, equipment, etc.). On the exam, you might be given a series of cash flows and asked to calculate NPV at a given discount rate (which tests your PV skills) or asked to find IRR (which might require trial-and-error or knowledge of a financial calculator/Excel). You could also be asked conceptually, e.g., “What does a positive NPV signify?” (Ans: project is expected to create value, earning above the hurdle rate) or “If IRR = 15% and WACC = 10%, what’s the NPV sign?” (Ans: NPV > 0). Being adept at these calculations is crucial for anyone in corporate finance or investment roles.

**Instructional Resources**

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*NPV Explained:* **Investopedia – Net Present Value (NPV)** – a detailed article explaining NPV with 39 41

examples and formulas . It often includes a step-by-step example of a project, and discusses pitfalls and comparisons with IRR.

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*IRR Explained:* **Investopedia – Internal Rate of Return (IRR)** – similar style to NPV’s article, it defines IRR and often goes through an example of finding it (maybe using interpolation if not using a calculator).

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*Video Tutorial:* There are many. Search for *“NPV IRR tutorial”* on YouTube. For example, **“Capital Budgeting NPV and IRR in Excel”** – this kind of video will show how to calculate NPV and IRR using

formulas and Excel, reinforcing understanding. Even if you do it manually on paper in the exam, visualizing it helps.

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*Practice:* The best practice is to actually compute NPV and IRR for a small set of projects. You can use Excel’s NPV and IRR functions to check your manual work. Also, look at examples where NPV and IRR might conflict (if given, say, different scale projects or non-conventional cash flows). But for a

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placement exam, straightforward cases are likely – e.g., one initial outlay, then a series of positive inflows.

**Practice Problems**

1.

**NPV Calculation:** A project requires an initial investment of \$10,000 (cash outflow at t=0) and is

expected to generate \$3,000 per year for 5 years (cash inflows at t=1 to 5). If the required rate of return is 7%, what is the NPV? *(First, note cash flows: CF0 = -10000; CF1–5 = +3000 each. Discount each inflow: PV of inflows = 3000*(1 - 1.07^-5)/0.07 = 3000 \* 4.1002 = \$12,300.6 (using annuity formula). NPV = 12,300.6 - 10,000 = **\$2,300.6** (approx). Positive NPV, accept the project.)\*

2.

**IRR Estimation:** Using the above project’s cash flows (\$10k outflow, \$3k for 5 years), what is the approximate IRR? *(We solve 0 = -10000 + 3000*[(1 - (1+IRR)^-5)/IRR]. Try IRR = 10%: NPV = -10000 + 3000*3.790 = -10000 + 11,370 = +\$1,370 (positive, so IRR > 10%). Try IRR = 15%: factor = 3.352, PV inflows = 3000*3.352 = 10,056, NPV ≈ +\$56 (very close to zero). Try IRR = 15.1%: probably slight negative. So IRR ≈ **15%**.)\*

3.

**Decision Rule:** A project has IRR of 8%. The company’s cost of capital is 10%. Should they accept?

What about if cost of capital is 5%? *(If cost is 10%, IRR (8%) is below hurdle, so NPV would be negative – reject. If cost is 5%, IRR is above hurdle, NPV positive – accept.)*

4.

**Mutually Exclusive Choice:** Project A: NPV = \$5,000 at 10% discount. Project B: NPV = \$4,500 at 10% discount. (Assume you can only choose one.) Which project would you choose and why? What if Project B had a higher IRR but slightly lower NPV? *(Generally, choose Project A because it adds more*

*value (\$500 more NPV). Even if Project B’s IRR is higher, unless capital is constrained or some specific reason, NPV is the more direct value-add measure. This tests understanding that NPV is primary.)*

5.

**Payback (just in case):** A project costs \$4,000 and returns \$1,200 per year. What is the payback

period? (Not considering time value). *(4000/1200 = 3.33 years).* Why might NPV be a better measure than payback? *(NPV considers time value and all cash flows; payback ignores what happens after cutoff and the timing of cash flows.)*

**Closing Notes**

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**Efficiency Tip:** Practice all the above calculations with Excel or a financial calculator, even if you can

do them by hand. This builds speed and confidence. On the exam, if it’s online, you can use spreadsheet calculations to double-check your work quickly. For example, you can set up a quick NPV calculation or use =STDEV() on some numbers if needed. *However, ensure you also understand the concepts without solely relying on tools,* in case you need to explain a result.

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**Diverse Practice:** Don’t just read examples – actively work through them. After reviewing a topic

(say, portfolio return), come up with your own small problem (e.g., “what if weights were different?”) and solve it. The provided practice problems in each section are a good start. If you get stuck, revisit the examples or resources. The more problems you solve, the more second-nature these become. •

**Conceptual Understanding:** Focus on the “why” behind each formula or method. It’s not enough to memorize formulas – try to intuitively understand them. For instance, know *why* increasing the discount rate lowers NPV, or *why* diversification reduces risk. This will help if you encounter variations of questions you haven’t seen before. Many errors on placement exams come from misapplying concepts (e.g., discounting when you should compound or vice versa, adding cash flows from different times without adjusting them, etc.). If you deeply understand the principles, you can reason through unfamiliar problems.

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**Time Management:** In exam setting, allocate your time wisely. For calculation-heavy problems, set them up methodically (write out what’s given, what’s needed, any formula) to avoid mistakes. If a question seems complex, break it into parts (e.g., first find PV of part A, then of part B, then add).

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**Real-world context:** Sometimes grounding a concept in a real-world context helps memory. Think of PV as “today’s price of tomorrow’s money,” think of the balance sheet like a picture of a company’s

finances (assets = who has claims via liabilities and equity). These little interpretations can make recall easier.

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**Keep Calm and Calculate:** Finally, stay confident. You’ve gathered a powerful set of tools and

knowledge. Approach each question systematically – identify the concept (TVM? returns? statements?), recall the relevant formula or reasoning, then apply it. With practice and this guide, you’ll be well-prepared to ace the finance placement exam!

Good luck with your studies, and remember: **every finance expert started with these fundamentals**.

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Mastering them now will pay dividends (pun intended) throughout your MBA coursework and career

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. Happy learning!

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