



The Global Mark of Distinction in Alternative Investments



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CAIA[®] Prerequisite Study Guide

Chartered Alternative Investment
Analyst Association[®]

The CAIA Prerequisite Program

The CAIA Association was established with the belief that a strong foundation of knowledge specific to alternative investments is essential for all AI professionals. Given this objective, the program provides a broad-based curriculum in alternatives, covering the main areas of hedge funds, private equity, commodities, real estate and managed futures. Level I of the CAIA program requires candidates to study the application of basic analytical tools and the fundamentals of alternative investment vehicles. Level II applies these analytics within an asset allocation, risk management, and decision-making framework. Both incorporate ethics and professional conduct.

Candidates registered for the program are assumed to have an understanding of the basic concepts of finance and quantitative analysis. This includes knowledge about the instruments that trade in traditional markets, models used to value these instruments, and the tools and methods used to analyze data. New candidates to the CAIA program should use these prerequisite materials to gain an understanding of what they are expected to know prior to becoming a Level I candidate.

The CAIA Prerequisite Study Guide and PDR

The CAIA Prerequisite Program organizes these foundations into topics and learning objectives in a way similar to its Level I and Level II programs. It is assumed that all CAIA candidates have an understanding of the prerequisite material. Candidates can expect to incorporate this material into Level I and Level II examination questions. For example, a candidate may be expected to evaluate the output of a regression analysis, calculate the value of a bond and analyze the payoffs of various option contracts.

We therefore recommend that all candidates work through the outline and take the Prerequisite Diagnostic Review (PDR), an assessment tool available on the CAIA website. Candidates who score 70% or higher on the PDR are assumed to have the background knowledge necessary to begin Level I of the CAIA program.

The Structure of the Study Guide

The Prerequisite Study Guide is separated into 12 topics organized around key terms and learning objectives. Key terms require a brief definition and/or description. The learning objectives define specific tasks such as to explain, to understand, or to calculate, and require that you master that task.

The study guide is designed to be used in conjunction with two textbooks: 1. *Quantitative Investment Analysis* by DeFusco, McLeavey, Pinto, and Runkle (Wiley Publishers, 2nd Edition), and 2. *Investments* by Bodie, Kane, and Marcus (McGraw Hill Publishers, 8th Edition). These textbooks are recognized as the best blend of practical and theoretical coverage of traditional investments and quantitative analysis. While you can obtain the

material from other textbooks, working through the material will be made easier by using these materials.

See the CAIA website for information about how to purchase the textbooks.

The Prerequisite Diagnostic Review (PDR)

The Prerequisite Diagnostic Review is available via unrestricted access on the CAIA website. There are two versions labeled Form A and Form B, both covering the same material. We recommend that you take the review under CAIA exam conditions -- a two hour (120 minute) time limit, a calculator, and no outside reference materials. An answer key is provided.

Calculator Policy

You will need a calculator to work through the prerequisite materials. For your information, the CAIA Association allows candidates to bring into the examination the TI BA II Plus (as well as the Professional model) or the HP 12C (as well as the Platinum edition). No other calculators will be allowed in the testing center.

Prerequisite Study Materials

Defusco, Richard A., Dennis W. McLeavey, Jerald E. Pinto, and David E. Runkle. *Quantitative Investment Analysis*. 2nd ed. New Jersey: John Wiley and Sons Inc, 2007.

Bodie, Zvi, Alex Kane, and Alan J. Marcus. *Investments*, 8th edition. New York: McGraw-Hill Irwin, 2008. ISBN: 978-0-07-338237-1.

Prerequisite Program Outline

Part I: Quantitative Analysis

Topic 1: The Time Value of Money

Topic 2: Probability Distributions, Sampling, and Hypothesis Testing

Topic 3: Correlation, Regression, and Time Series Analysis

Topic 4: Portfolio Concepts

Part II: Markets, Instruments, Valuation, and Investment Theory

Topic 5: Markets and Instruments

Topic 6: Fixed Income Securities

Topic 7: Equity Securities

Topic 8: The Basic Relationship between Risk and Return

Topic 9: Market Efficiency

Topic 10: Applied Portfolio Management

Topic 11: Options and the Black-Scholes Option Pricing Model

Topic 12: Other Derivatives and Market Strategies

Part I: Quantitative Analysis

Topic 1: The Time Value of Money

Readings

- Defusco, Richard A., Dennis W. McLeavey, Jerald E. Pinto, and David E. Runkle. *Quantitative Investment Analysis*. 2nd ed. New Jersey: John Wiley and Sons Inc, 2007. Chapters 1 - 2.

Chapter 1

The Time Value of Money

Chapter 1 builds the fundamentals of time value of money for lump sums and annuities. The chapter's focus is on the mechanics of time value calculations under a variety of circumstances. Also discussed is the meaning and interpretation of interest rates.

Keywords

Annuity due	Nominal risk-free interest rate
Cash flow additivity principle	Opportunity cost
Compounding	Ordinary annuity
Default risk premium	Perpetuity
Discount	Present value
Effective annual rate	Principal
Future value	Quoted interest rate
Inflation premium	Real risk-free interest rate
Interest rate	Simple interest
Liquidity premium	State annual interest rate
Maturity premium	Time value of money

Learning Objectives

1. Interpret interest rates as a required rate of return, a discount rate or an opportunity cost.
2. Explain an interest rate as the sum of a real risk-free rate, an expected premium for inflation, and other premiums that compensate investors for distinct types of risk.
3. Calculate and interpret the effective annual rate, given the stated annual interest rate and the frequency of compounding, and solve time value of money problems when compounding periods are other than annual.
4. Calculate and interpret a future value (FV) and a present value (PV) of a single sum of money, an ordinary annuity, an annuity due, a perpetuity (PV only), and a series of unequal cash flows.
5. Calculate an unknown variable in time value of money problems.

6. Draw a timeline and solve time value of money applications (for example, mortgages and savings for college tuition and retirement).

Chapter 2

Discounted Cash Flow Applications

The first part of this chapter introduces two key valuation models -- net present value and the internal rate of return. Building on these models, the chapter next discusses the measurement of portfolio returns, and concludes with a discussion of yield calculations.

Keywords

Bank discount rate	Money market yield (CD equivalent yield)
Bond-equivalent yield	Net present value
Bond-equivalent basis	Performance appraisal
Capital budgeting	Performance measurement
Capital structure	Pure discount instruments
Effective annual yield	Time-weighted rate of return
Holding period return	Weighted-average cost of capital
Hurdle rate	Working capital management
Incremental cash flows	
Internal rate of return	

Learning Objectives

1. Calculate and interpret the net present value (NPV) and the internal rate of return (IRR) of an investment, contrast the NPV rule to the IRR rule, and identify problems associated with the IRR rule.
2. Define, calculate, and interpret a holding period return (total return).
3. Calculate, interpret, and distinguish between the money-weighted and time-weighted rates of return of a portfolio and appraise the performance of portfolios based on these measures.
4. Calculate and interpret the bank discount yield, holding period yield, effective annual yield, and money market yield for a US Treasury bill.
5. Convert among holding period yields, money market yields, effective annual yields, and bond equivalent yields.

Topic 2: Probability Distributions, Sampling, and Hypothesis Testing

Readings

- Defusco, Richard A., Dennis W. McLeavey, Jerald E. Pinto, and David E. Runkle. *Quantitative Investment Analysis*. 2nd ed. New Jersey: John Wiley and Sons Inc, 2007. Chapters 3 - 7.

Chapter 3

Statistical Concepts and Market Returns

This chapter begins the study of statistics and provides a picture of the overall field. For example, the scope of statistics and its branches are described, and the concepts of population and sample are explained. Because data come in a variety of types, the chapter concludes by discussing how data can be measured and analyzed.

Keywords

Absolute dispersion	Mode
Absolute frequency	Nominal scales
Arithmetic mean	Ordinal scales
Coefficient of variation	Parameter
Cost averaging	Percentiles
Cross-sectional data	Platykurtic
Cumulative relative frequency	Population
Deciles	Population mean
Descriptive statistics	Population standard deviation
Dispersion	Population variance
Excess kurtosis	Quantile
Expected value	Quartiles
Frequency distribution	Quintiles
Geometric mean	Range
Histogram	Ratio scales
Harmonic mean	Relative dispersion
Interquartile range	Relative frequency
Interval	Sample
Leptokurtic	Sample excess kurtosis
Linear interpolation	Sample kurtosis
Mean absolute deviation	Sample mean
Mean excess return	Sample skewness
Measurement scales	Sample standard deviation
Measure of central tendency	Sample statistic
Measures of location	Sample variance
Median	Semideviation
Mesokurtic	Semilogarithmic
Modal interval	Semivariance

Skewed
Skewness
Statistical inference
Statistics
Target semideviation
Target semivariance

Time-series data
Trimmed mean
Weighted mean
Winsorized mean

Learning Objectives

1. Differentiate between descriptive statistics and inferential statistics, between a population and a sample, and among the types of measurement scales.
2. Explain a parameter, a sample statistic, and a frequency distribution.
3. Calculate and interpret relative frequencies and cumulative relative frequencies, given a frequency distribution.
4. Describe the properties of a data set presented as a histogram or a frequency polygon.
5. Define, calculate, and interpret measures of central tendency, including the population mean, sample mean, arithmetic mean, weighted average or mean (including a portfolio return viewed as a weighted mean), geometric mean, harmonic mean, median, and mode.
6. Describe, calculate, and interpret quartiles, quintiles, deciles, and percentiles.
7. Define, calculate and interpret a range and a mean absolute deviation and the variance and standard deviation of a population and of a sample.
8. Contrast variance with semivariance and target semivariance.
9. Calculate and interpret the proportion of observations falling within a specified number of standard deviations of the mean using Chebyshev's inequality.
10. Define, calculate and interpret the coefficient of variation and the Sharpe ratio.
11. Define and interpret skewness, explain the meaning of a positively or negatively skewed return distribution, and describe the relative locations of the mean, median, and mode for a nonsymmetrical distribution.
12. Define and interpret measures of sample skewness and kurtosis.
13. Discuss the use of arithmetic mean or geometric mean when determining investment returns.

Chapter 4

Probability Concepts

Probability concepts and tools necessary for most of an analyst's work are relatively few and simple but require understanding to apply. This chapter presents the essentials for working with probability, expectation, and variance, drawing on examples from equity and fixed income analysis.

Keywords

Addition rule for probabilities
Combination

Complement
Conditional expected values

Conditional probabilities
Conditional variances
Covariance matrix
Empirical probability
Events
Exhaustive
Independent
Joint probability
Joint probability function
Marginal probabilities
Mutually exclusive
 n factorial
Objective probabilities

Outcomes
Pairs arbitrage trade
Permutation
Posterior probability
Priori probability
Probability
Random variable
Subjective probability
Total probability rule
Tree diagram
Unconditional probability
Variance

Learning Objectives

1. Define a random variable, an outcome, an event, mutually exclusive events, and exhaustive events.
2. Explain the two defining properties of probability and distinguish among empirical, subjective, and a priori probabilities.
3. State the probability of an event in terms of odds for or against the event.
4. Distinguish between unconditional and conditional probabilities.
5. Define and explain the multiplication, addition, and total probability rules.
6. Calculate and interpret the joint probability of two events, the probability that at least one of two events will occur, given the probability of each and the joint probability of the two events, and a joint probability of any number of independent events.
7. Distinguish between dependent and independent events.
8. Calculate and interpret, using the total probability rule, an unconditional probability.
9. Explain the use of conditional expectation in investment applications.
10. Diagram an investment problem using a tree diagram.
11. Calculate and interpret covariance and correlation.
12. Calculate and interpret the expected value, variance, and standard deviation of a random variable and of returns on a portfolio.
13. Calculate and interpret covariance given a joint probability function.
14. Calculate and interpret an updated probability using Bayes' formula.
15. Identify the most appropriate method to solve a particular counting problem and solve counting problems using the factorial, combination, and permutation notations.

Chapter 5

Common Probability Distributions

This chapter examines the four probability distributions given by the uniform, binomial, normal, and lognormal distributions, and their use in valuation models such as the capital

asset pricing model and option pricing models. These distributions serve as foundations for hypothesis testing, regression analysis, and time-series analysis.

Keywords

Asian call option	Node
Back simulation	Price relative
Bernoulli trial	Probability density function
Binomial tree	Probability distribution
Continuous random variable	Pseudo-random numbers
Continuously compounded return	Random number generator
Cumulative distribution function	Random variable
Discrete random variable	Safety-first rules
Down transition probability	Shortfall risk
European-style option	Standard normal distribution
Financial risk	Stress testing/scenario analysis
Historical simulation	Unit normal distribution
Mean-variance analysis	Univariate distribution
Monte Carlo simulation	Up transition probability
Multivariate normal distribution	Volatility

Learning Objectives

1. Explain a probability distribution and distinguish between discrete and continuous random variables.
2. Describe the set of possible outcomes of a specified discrete random variable.
3. Interpret a probability function, a probability density function, and a cumulative distribution function.
4. Calculate and interpret probabilities for a random variable, given its cumulative distribution functions.
5. Define a discrete uniform random variable and a binomial random variable.
6. Calculate and interpret probabilities given the discrete uniform and the binomial distribution functions, and calculate the expected value and variance of a binomial random variable.
7. Construct a binomial tree to describe stock price movement.
8. Describe the continuous uniform distribution and calculate and interpret probabilities, given a continuous uniform probability distribution.
9. Explain the key properties of the normal distribution, distinguish between a univariate and a multivariate distribution, and explain the role of correlation in the multivariate normal distribution.
10. Determine the probability that a normally distributed random variable lies inside a given confidence interval.
11. Define the standard normal distribution, explain how to standardize a random variable, and calculate and interpret probabilities using the standard normal distribution.

12. Define shortfall risk, calculate the safety-first ratio, and select an optimal portfolio using Roy's safety-first criterion.
13. Explain the relationship between normal and lognormal distributions and why the lognormal distribution is used to model asset prices.
14. Distinguish between discretely and continuously compounded rates of return and calculate and interpret a continuously compounded rate of return, given specific holding period return.
15. Explain Monte Carlo simulation and historical simulation and describe their major applications and limitations.

Chapter 6 Sampling and Estimation

The first part of this chapter examines various methods for obtaining information on a population through samples. The chapter also examines the construction of confidence intervals and provides an introduction to hypothesis testing.

Keywords

Data mining	Out-of-sample test
Degree of confidence	Panel data
Degrees of freedom	Point estimate
Estimate	Sample selection bias
Estimators	Sampling
Indexing	Sampling error
Intergenerational data-mining	Simple random sampling
Longitudinal data	Systematic sampling
Look-ahead bias	Time-period bias

Learning Objectives

1. Define simple random sampling, sampling error, and sampling distribution, and interpret sampling error.
2. Distinguish between simple random and stratified random sampling.
3. Distinguish between time-series and cross-sectional data.
4. Interpret the central limit theorem and describe its importance.
5. Calculate and interpret the standard error of the sample mean.
6. Distinguish between a point estimate and a confidence interval estimate of a population parameter.
7. Identify and describe the desirable properties of an estimator.
8. Explain the construction of confidence intervals.
9. Describe the properties of Student's t -distribution and calculate and interpret its degrees of freedom.
10. Calculate and interpret a confidence interval for a population mean, given a normal distribution with a known population variance, an unknown population variance, and an unknown variance and a large sample size.

11. Discuss the issues regarding selection of the appropriate sample size, data-mining bias, sample selection bias, survivorship bias, look-ahead bias, and time-period bias.

Chapter 7

Hypothesis Testing

This chapter examines the framework of hypothesis testing and tests concerning means and variances. Testing hypotheses about differences between means is addressed, as well as testing hypotheses about a single variance and differences between variances. The chapter concludes with an overview of techniques related to statistical inference.

Keywords

Estimation	Robust
Hypothesis testing	Spearman rank correlation coefficient
Level of significance	Statistical significance
Nonparametric test	t-test
One-sided (one-tailed) hypothesis test	Two-sided (two-tailed) hypothesis test
Paired comparisons test	Type I error
Paired observations	Type II error
Parametric test	
Power of a test	

Learning Objectives

1. Define a hypothesis, describe the steps of hypothesis testing, interpret and discuss the choice of the null hypothesis and alternative hypothesis and alternative hypothesis, and distinguish between one-tailed and two-tailed tests of hypotheses.
2. Define and interpret a test statistic, a Type I and a Type II error, and a significance level, and explain how significance levels are used in hypothesis testing.
3. Define and interpret a decision rule and the power of a test, and explain the relation between confidence intervals and hypothesis tests.
4. Distinguish between a statistical result and an economically meaningful result.
5. Explain and interpret the p-value as it relates to hypothesis testing.
6. Identify the appropriate test statistic and interpret the results for a hypothetical test concerning the population mean of both large and small samples when the population is normally or approximately distributed and the variance is known or unknown.
7. Identify the appropriate test statistic and interpret the results for a hypothetical test concerning the equality of the means of two normally distributed populations, based on independent random samples with equal or unequal assumed variances.

8. Identify the appropriate test statistic and interpret the results for a hypothesis test concerning the mean difference of two normally distributed populations (paired comparisons test).
9. Identify the appropriate test statistic and interpret the results for a hypothesis test concerning the variance of a normally distributed population and the equality of the variances of two normally distributed populations.
10. Distinguish between parametric and nonparametric tests and describe the situations in which the use of nonparametric tests may be appropriate.
11. Explain the use of the Spearman rank correlation coefficient in a test where the correlation between two variables is zero.

Topic 3: Correlation, Regression, and Time Series Analysis

Readings

- Defusco, Richard A., Dennis W. McLeavey, Jerald E. Pinto, and David E. Runkle. *Quantitative Investment Analysis*. 2nd ed. New Jersey: John Wiley and Sons Inc, 2007. Chapters 8 - 10.

Chapter 8

Correlation and Regression

This chapter introduces correlation analysis through the calculation, interpretation, limitations, and statistical testing of correlations. Also introduced are the basic concepts of regression analysis, a technique to explore the ability of one or more variables (independent variables) to explain or predict another variable (the dependent variable).

Keywords

Analysis of variance	Linear regression
Correlation analysis	Nonlinear relation
Dependent variable	Parameter instability
Error term	Regression coefficients
Estimated or fitted parameters	Scatter plot
Independent variable	Spurious correlation
Linear association	

Learning Objectives

1. Calculate and interpret a sample correlation coefficient and interpret a scatter plot.
2. Explain the limitations to correlation analysis, including outliers and spurious correlation.
3. Formulate a test of the hypothesis that the population correlation coefficient equals zero and determine whether the hypothesis is rejected at a given level of significance.
4. Differentiate between the dependent and independent variables in a linear regression.
5. Explain the assumptions underlying linear regression and interpret the regression coefficients.
6. Calculate and interpret the standard error of estimate, the coefficient of determination, and a confidence interval for a regression coefficient.
7. Formulate a null and alternative hypothesis about a population value of a regression coefficient, select the appropriate test statistic, and determine whether the null hypothesis is rejected at a given level of significance.
8. Calculate a predicted value for the dependent variable, given an estimated regression model and a value for the independent variable and calculate and interpret a confidence interval for the predicted value of a dependent variable.

9. Describe the use of analysis of variance (ANOVA) in regression analysis, interpret ANOVA results, and calculate and interpret an F -statistic.
10. Discuss the limitations of regression analysis.

Chapter 9

Multiple Regression and Issues in Regression Analysis

The first part of this chapter illustrates the basic concepts and models of multiple regression analysis. The three major violations of the regression model are discussed along with how to diagnose violations of assumptions and what remedial steps to take when assumptions are violated. The last part of the chapter examines guidelines for building good regression models and discusses ways that analysis can go wrong.

Keywords

Adjusted R^2	Model specification
Analysis of variance (ANOVA)	Multicollinearity
Collinearity	Multiple linear regression model
Conditional heteroskedasticity	Nonstationarity
Consistency	Partial regression coefficients
Discriminant analysis	Positive serial correlation
Dummy variable	Probit models
First-order serial correlation	Qualitative dependent variables
Generalized least squares	Regression coefficients
Heteroskedastic	Robust standard errors
Logit models	Unconditional heteroskedasticity

Learning Objectives

1. Formulate a multiple regression equation to describe the relation between a dependent variable and several independent variables, determine the statistical significance of each independent variable, and interpret the estimated coefficients and their p -values.
2. Formulate a null and an alternative hypothesis about the population value of a regression coefficient, calculate the value of the test statistic, determine whether to reject the null hypothesis at a given level of significance by using a one-tailed or two-tailed test, and interpret the results of the test.
3. Calculate and interpret a confidence interval for the population value of a regression coefficient and a predicted value for the dependent variable, given an estimated regression model and assumed values for the independent variables.
4. Explain the assumptions of a multiple regression model.
5. Calculate and interpret the F -statistic and discuss how it is used in regression analysis, define and interpret the R^2 and adjusted R^2 in multiple regression, and infer how well a regression model explains the dependent variable by analyzing the output of the regression equation and an ANOVA table.

6. Formulate a multiple regression equation by using dummy variables to represent qualitative factors and interpret the coefficients and regression results.
7. Discuss the types of heteroskedasticity and the effects of heteroskedasticity and serial correlation on statistical inference.
8. Describe multicollinearity and discuss its causes and effects in regression analysis.
9. Discuss the effects of model misspecification on the results of a regression analysis and explain how to avoid the common forms of misspecification.
10. Discuss models with qualitative dependent variables.
11. Interpret the economic meaning of the results of multiple regression analysis and critique a regression model and its results.

Chapter 10

Time-Series Analysis

This chapter applies the linear regression model to a given time series. The chapter discusses procedures to transform the time series, or specify the regression model differently, so that the assumptions of the linear regression models are met.

Keywords

Autocorrelation	Log-linear trend
Autoregressive model	Mean reversion
Chain rule of forecasting	n-period moving average
Covariance stationary	Out-of-sample forecast errors
Error autocorrelations	Regimes
First-differencing	Residual autocorrelations
Heteroskedasticity	Root mean squared error
Homoskedasticity	Trend
In-sample forecast errors	Unit root
Linear trend	

Learning Objectives

1. Calculate and evaluate the predicted trend value for a time series, modeled as either a linear trend or a log-linear trend, given the estimated trend coefficients.
2. Discuss the factors that determine whether a linear or a log-linear trend should be used with a particular time series and evaluate the limitations of trend models.
3. Explain the requirement for a time series to be covariance stationary, differentiate between stationary and nonstationary time series by visual inspection of time series plots, and discuss the significance of a series not being stationary.
4. Discuss the structure of an autoregressive (AR) model of order p , calculate one and two-period ahead forecasts given the estimated coefficients, and explain

- how autocorrelations of the residuals can be used to test whether the autoregressive model fits the time series.
5. Explain mean reversion and calculate a mean-reverting level.
 6. Contrast in-sample and out-of-sample forecasts and compare the forecasting accuracy of different time-series models based on the root mean squared error criterion.
 7. Discuss the instability of coefficients of time-series models.
 8. Describe the characteristics of random walk processes and contrast them to covariance stationary processes.
 9. Discuss the implications of unit roots for time-series analysis, explain when unit roots are likely to occur and how to test for them, and demonstrate how a time series with a unit root can be transformed so it can be analyzed with an AR model.
 10. Discuss the steps of the unit root test for nonstationarity and explain the relation of the test to autoregressive time-series models.
 11. Discuss how to test and correct for seasonality in a time-series model and calculate and interpret a forecasted value using an AR model with a seasonal lag.
 12. Explain autoregressive conditional heteroskedasticity (ARCH) and discuss how ARCH models can be applied to predict the variance of a time series.
 13. Explain how time-series variables should be analyzed for nonstationarity and/or cointegration before use in a linear regression.
 14. Select and justify the choice of a particular time-series model from a group of models.

Topic 4: Portfolio Concepts

Readings

- Defusco, Richard A., Dennis W. McLeavey, Jerald E. Pinto, and David E. Runkle. *Quantitative Investment Analysis*. 2nd ed. New Jersey: John Wiley and Sons Inc, 2007. Chapter 11.

Chapter 11 Portfolio Concepts

This chapter examines quantitative methods to support the management of portfolios. The first part of the chapter focuses on mean-variance analysis and related models, and the problems encountered using mean-variance analysis are addressed. The single-factor market model is introduced, along with multiple factor models used to explain asset returns.

Keywords

Active return	Fundamental betas
Active risk	Instability in the mean-variance frontier
Active specific risk	Market risk premium
Adjusted beta	Markowitz decision rule
Arbitrage	Mean-variance analysis
Arbitrage opportunity	Minimum-variance frontier
Arbitrage portfolio	Opportunity set
Asset selection risk	Orthogonal
Benchmark	Portfolio performance attribution
Capital allocation line	Portfolio possibilities curve
Capital market line	Pure factor portfolio
Efficient portfolio	Standardized beta
Factor betas	Systematic factors
Factor loadings	Tracking error
Factor risk premium	Tracking portfolio
Factor risk price	Tracking risk
Factor sensitivity	

Learning Objectives

1. Discuss mean-variance analysis and its assumptions, and calculate the expected return and the standard deviation of return for a portfolio of two or three assets.
2. Explain the minimum-variance and efficient frontiers, and discuss the steps to solve for the minimum-variance frontier.

3. Discuss diversification benefits, and explain how the correlation in a two-asset portfolio and the number of assets in a multi-asset portfolio affects the diversification benefits.
4. Calculate the variance of an equally weighted portfolio on n stocks, explain the capital allocation and the capital market lines (CAL and CML) and the relation between them, and calculate the values of one of the variables given the values of the remaining variables.
5. Explain the capital asset pricing model (CAPM), including its underlying assumptions and the resulting conclusions.
6. Explain the choice between two portfolios, given their mean returns and standard deviations, with and without borrowing and lending at the risk-free rate.
7. Discuss the security market line (SML), the beta coefficient, the market risk premium, and the Sharpe ratio, and calculate the value of one of these variables given the values of the remaining variables.
8. Explain the market model, and state and interpret the market model's predictions with respect to asset returns, variances, and covariances.
9. Calculate the correlation between the returns on two assets implied by the asset's betas, their residual standard deviations from the market model, and the variance of the market return.
10. Calculate an adjusted beta, and discuss the use of adjusted and historical betas as predictors of future betas.
11. Discuss reasons for and problems related to instability in the minimum-variance frontier.
12. Discuss and compare macroeconomic factor models, fundamental factor models, and statistical factor models.
13. Calculate the expected return on a portfolio of two stocks, given the estimated macroeconomic factor model for each stock.
14. Discuss the arbitrage pricing theory (APT), including its underlying assumptions and its relation to the multifactor models, calculate the expected return on an asset given an asset's factor sensitivities and the factor risk premiums, and determine whether an arbitrage opportunity exists, including how to exploit the opportunity.
15. Explain the sources of active risk, define and interpret tracking error, tracking risk, and the information ratio, and explain factor portfolio and tracking portfolio.
16. Compare and contrast the conclusions and the underlying assumptions of the CAPM and APT models, and explain why an investor can possibly earn a substantial premium for exposure to dimensions of risk unrelated to market movements.

Part II: Markets, Instruments, Valuation, and Investment Theory

Topic 5: Markets and Instruments

Readings

- Bodie, Zvi, Alex Kane, and Alan J. Marcus. *Investments*. 8th ed. New York: McGraw-Hill Irwin, 2008. Chapters 1 - 4.

Chapter 1

The Investment Environment

Chapter 1 introduces a myriad of investment terms. Real assets are differentiated from financial assets, and the major categories of financial assets are defined. The risk/return tradeoff and the reality that most assets are efficiently (fairly) priced is introduced. The role of financial intermediaries and the increased globalization of financial markets are discussed.

Keywords

Agency problem
Asset allocation
Corporate governance
Derivative securities
Efficient markets
Financial assets
Financial engineering

Investment banking
Investment companies
Primary markets
Real assets
Secondary markets
Securitization
Security selection

Learning Objectives:

1. Distinguish between real assets and financial assets.
2. Understand the role financial markets play in an economy.
3. Understand the concept of corporate governance and its connection to corporate ethics.
4. Describe the investment process and competitive markets.
5. Identify the participants in the financial markets.
6. Understand recent trends in financial markets.

Chapter 2

Asset Classes and Financial Instruments

Chapter 2 describes the financial instruments that trade in primary and secondary markets as well as various indices used as market indicators. There is an introductory discussion of options and futures.

Keywords

Bankers' acceptances	Futures contract
Brokers' call	Mortgage-backed securities
Call option	Municipal bonds
Certificates of deposit	Options
Commercial paper	Put option
Dow Jones Industrial Average	Repos and Reverses
Federal funds	

Learning Objectives

1. Describe the securities that comprise the money market and the bond market.
2. Calculate equivalent taxable yields.
3. Differentiate equity from debt.
4. Understand how the major equity indices are derived.
5. Understand options (calls and puts) and futures.

Chapter 3

How Securities Are Traded

Chapter 3 covers the trading of securities in primary and secondary markets on organized exchanges as well as in over-the-counter markets. Margin trading and short selling are discussed along with detailed examples of margin agreements. The chapter discusses elements of regulation and ethics associated with security transactions.

Keywords

Bid-ask spread	Market order
Firm commitment	Over-the-counter markets
Initial public offering (IPO)	Private placement
Insider trading	Short sale
Limit order	Specialist
Margin	Underwriter

Learning Objectives

1. Describe the various processes used in issuing securities, including the role of investment banks, shelf registration, private placements, and initial public offerings.
2. Compare and contrast types of markets and types of orders.
3. Calculate margin, rates of return on margin trades, and the stock price that will generate a margin call.
4. Calculate the rate of return on short trades and the stock price that will generate a margin call on a short sale.
5. Describe the different forms of regulation pertaining to the securities markets.

Chapter 4

Mutual Funds and Other Investment Companies

Chapter 4 covers investment companies and mutual funds. The chapter discusses services provided by mutual funds as well as associated fees. Performance of investment companies and impact of taxation are presented. Investment policies of different funds are described and sources of information on investment companies are identified.

Keywords

12b-1 charges
Asset allocation funds
Back-end load
Balanced funds
Closed-end funds
Exchange-traded funds (ETFs)
Front-end load
Hedge funds
Index funds

Load
Money market funds
Net asset value (NAV)
Open-end funds
Real estate investment trusts (REITs)
Soft dollars
Turnover ratio
Unit investment trusts

Learning Objectives

1. Calculate net asset value.
2. Compare and contrast types of investment companies.
3. Compare and contrast types of mutual funds including exchange-traded funds.
4. Describe categories of mutual fund costs.
5. Calculate the rate of return on an investment in a mutual fund.
6. Describe how mutual funds are taxed.
7. State the general evidence regarding mutual fund performance.

Topic 6: Fixed Income Securities

Readings

- Bodie, Zvi, Alex Kane, and Alan J. Marcus. *Investments*. 8th ed. Boston: McGraw-Hill Irwin, 2008. Chapters 14 - 16.

Chapter 14

Bond Prices and Yields

Chapter 14 provides a discussion of the various types of bonds, bond ratings, and the determinants of bond risk. You will be shown how to calculate yields and prices and to identify factors used by the agencies in rating bonds. Characteristics such as call options and default potential, and the implication of these characteristics in bond pricing, are described.

Keywords

Accrued interest	Horizon analysis
Altman Z score	Indenture
Annuity	Indexed bonds
Asset-backed bonds	Inverse floater
Bond credit ratings	Junk bonds
Bond indenture	Preferred stock
Call provision	Put bonds
Catastrophe bonds	Realized compound return
Collateral	Sinking fund
Convertible bond	Subordination clause
Coupon	Yield to call
Debenture	Yield to maturity
Face value	Zero-coupon bond
Floating rate bond	

Learning Objectives

1. Interpret bond quotes.
2. Understand the basic characteristics of bonds.
3. Understand and calculate the conversion ratio, market conversion value, and conversion premium for convertible bonds.
4. Calculate the value of a bond.
5. Understand and calculate yield to maturity, yield to call, realized compound return, holding period return, and after tax returns.
6. Explain default risk and the determinants of bond safety.
7. Understand bond indentures and bond covenants.

Chapter 15

The Term Structure of Interest Rates

Chapter 15 describes the term structure of interest rates including the use of one-year rates in developing yields on longer-term securities, as well as forward rates as a means of valuing coupon instruments. The major theories used to explain interest rate movements are developed.

Keywords

Expectations hypothesis

Forward rates

Liquidity preference theory

Pure yield curve

Spot rate

Term structure

Learning Objectives

1. Calculate bond prices and the yield to maturity using zero-coupon bond yields.
2. Calculate forward rates under the expectations theory and the liquidity preference theory.
3. Understand the different theories regarding the term structure of interest rates.

Chapter 16

Managing Bond Portfolios

Chapter 16 uses the concepts and tools of the previous two chapters to develop active and passive bond portfolio management strategies. Convexity and duration are introduced as interest rate risk management tools, highlighting the latter's use as a key input to portfolio immunization strategies. Various active strategies are described.

Keywords

Bond-index funds

Contingent immunization

Convexity

Dedication

Duration

Immunization

Interest rate swap

Learning Objectives

1. Describe interest rate risk using six bond properties.
2. Describe duration as a measure of interest rate risk and understand the rules of duration.
3. Understand convexity as a measure of interest rate risk.
4. Calculate effective duration for callable bonds.
5. Understand passive bond management and passive strategies using index funds and immunization.

6. Understand active bond management and active strategies using horizon analysis and contingent immunization.

Topic 7: Equity Securities

Readings

- Bodie, Zvi, Alex Kane, and Alan J. Marcus. *Investments*. 8th ed. New York: McGraw-Hill Irwin, 2008. Chapter 18.

Chapter 18

Equity Valuation Models

Chapter 18 discusses the valuation of common stock. The relationships between intrinsic, market and book values are presented. Various valuation techniques are presented, and their relative strengths and weaknesses are discussed.

Keywords

Book value	Plowback ratio
Constant-growth	Present value of growth opportunities (PVGO)
Dividend payout ratio	Price-to-book ratio
Earnings retention ratio	Price-to-cash-flow ratio
Expected holding period return	Price-to-earnings ratio
Intrinsic value	Price-to-sales ratio
Liquidation value	Replacement cost
Market capitalization rate	Tobin's q ratio
Multistage growth models	
Payout ratio	

Learning Objectives

1. Understand the comparables method of valuation.
2. Using the dividend discount model, estimate firm value under conditions of constant-growth and multistage growth.
3. Understand earnings per share (EPS) and its relationship to growth opportunities.
4. Understand the free cash flow model.

Topic 8: The Basic Relationship between Risk and Return

Readings

- Bodie, Zvi, Alex Kane, and Alan J. Marcus. *Investments*. 8th ed. New York: McGraw-Hill Irwin, 2008. Chapters 5 - 9.

Chapter 5

Learning about Return and Risk from the Historical Record

Chapter 5 includes two major sections. The first describes the factors influencing the level of interest rates and discusses the Fisher Effect. The second shows how to calculate holding-period returns for different time periods and presents information about the historical risk/return record for different classes of financial assets. Also provided are statistical calculations of risk and returns measures.

Keywords

Annual percentage rates	Nominal interest rate
Arithmetic average	Normal distribution
Conditional tail expectation (CTE)	Real interest rate
Continuous compounding	Risk premium
Dividend yield	Sharpe ratio
Excess return	Skewness
Expected return	Standard deviation
Geometric average	t-statistic
Holding-period returns	Value at Risk (VaR)
Kurtosis	Variance
Lower partial standard deviation	

Learning Objectives

1. Compare and contrast real interest rates with nominal interest rates.
2. Calculate rates of return over different holding periods.
3. Calculate variance and standard deviation.
4. Calculate the arithmetic average return and the geometric average return.
5. Calculate the reward to variability ratio, also known as the Sharpe ratio.
6. Describe the normal distribution and deviations from normality.
7. Compare and contrast the historical record of returns on equities and debt.
8. Understand the probability of shortfall as a measure of investment risk.
9. Understand the risk measure known as Value at Risk (VaR).
10. Understand the risk measure known as conditional tail expectation or CTE.
11. Understand the risk measure known as the lower partial standard deviation or LPSD.

Chapter 6

Risk Aversion and Capital Allocation to Risky Assets

Chapter 6 describes the process of constructing a portfolio by combining risky assets with risk-free assets. The concepts of risk aversion and utility are used to illustrate how to determine an appropriate allocation mix.

Keywords

Certainty equivalent
Fair game
Indifference curve
Mean-variance criterion

Risk aversion
Risk lover
Risk neutral
Utility

Learning Objectives

1. Compare and contrast the concepts of risk aversion, risk neutral, and risk loving.
2. Understand and be able to calculate the utility value of an investment.
3. Understand the mean-variance criterion.
4. Describe the role of the risk-free asset in the portfolio.

Chapter 7

Optimal Risky Portfolios

Chapter 7 provides an understanding of systematic and firm-specific risk, and of how investors can reduce the amount of firm-specific risk through diversification. The chapter examines portfolio formation using a combination of two risky assets and multiple risky assets. The concept of an efficient portfolio is introduced.

Keywords

Correlation
Covariance
Diversifiable risk
Diversification
Efficient frontier
Firm-specific risk

Market risk
Minimum-variance portfolio
Nondiversifiable risk
Separation property
Systematic risk
Unique risk

Learning Objectives

1. Compare and contrast market risk, systematic risk, and nondiversifiable risk with unique risk, firm-specific risk, and diversifiable risk.
2. Understand the components used to determine the variance of a two asset portfolio.
3. Understand how the efficient frontier of risky assets is constructed.

4. Describe the result known as the separation property.

Chapter 8

Index Models

Chapter 8 derives the single-index model and illustrates how risk can be decomposed into a systematic and an unsystematic component. The chapter introduces the terms beta and alpha as portfolio management tools.

Keywords

Alpha
Beta
Regression equation

Residuals
Security characteristic line
Single-index model

Learning Objectives

1. Formulate the single-index model and understand what the model is measuring.
2. Estimate alpha using the regression equation for a single index model.
3. Estimate beta using the regression equation for a single index model.

Chapter 9

The Capital Asset Pricing Model

Chapter 9 presents the capital asset pricing model (CAPM), an equilibrium model for the pricing of assets based upon a systematic risk factor known as beta. The presentation includes the assumptions that underlie the CAPM, the major implications of the CAPM model, and the development of the security market line.

Keywords

Capital asset pricing model
Liquidity
Market model
Market portfolio

Market price of risk
Mutual fund theorem
Security market line

Learning Objectives

1. Understand the security market line.
2. Formulate beta and explain what beta measures.
3. Understand the capital asset pricing model (CAPM) and use the model to estimate expected return.

Topic 9: Market Efficiency

Readings

- Bodie, Zvi, Alex Kane, and Alan J. Marcus. *Investments*. 8th ed. New York: McGraw-Hill Irwin, 2008. Chapters 11 - 13.

Chapter 11

The Efficient Market Hypothesis

Chapter 11 introduces market efficiency as a hypothesis that securities are fairly priced. The implications of market efficiency for investors and studies of the efficient market hypothesis are presented in detail.

Keywords

Abnormal return	P/E effect
Book-to-market effect	Random walk
Efficient market hypothesis	Resistance levels
Event study	Semistrong-form efficiency
Fundamental analysis	Small-firm
Inside information	Strong-form efficiency
Lucky event issue	Support levels
Magnitude issue	Survivorship bias
Market anomalies	Technical Analysis
Neglected firm effect	Weak-form efficiency
Passive investment strategy	

Learning Objectives

1. Understand market efficiency and the concept of a random walk.
2. Describe the three levels of the efficient market hypothesis.
3. Compare and contrast technical analysis with fundamental analysis.
4. Compare and contrast active versus passive portfolio management.
5. Understand what information is derived when conducting an event study.
6. Relate the magnitude issue, the selection bias issue, and the lucky event issue to tests of efficient markets.
7. Understand the results of market efficiency tests.
8. Apply the results of tests of market efficiency to mutual funds.

Chapter 12

Behavioral Finance and Technical Analysis

Chapter 12 discusses behavioral finance and its implications for the theory of efficient markets. By questioning investor rationality, the chapter provides evidence of errors

made by individuals in processing information and biases observed in human behavior. The chapter also examines the linkage between technical analysis and behavioral finance.

Keywords

Behavioral finance
Confidence index
Conservatism
Dow Theory
Forecasting errors
Framing
Mental accounting

Moving average
Overconfidence
Prospect theory
Put-call ratio
Regret avoidance
Sample size neglect
Trin statistic

Learning Objectives

1. Understand the premise of behavioral finance.
2. Understand four biases related to information processing.
3. List and explain behavior biases.
4. Relate limits to arbitrage investor behavior.
5. Summarize the following technical trading strategies: Dow Theory; moving averages; breadth; trin statistic; confidence index; and put/call ratio.

Topic 10: Applied Portfolio Management

Readings

- Bodie, Zvi, Alex Kane, and Alan J. Marcus. *Investments*. 8th ed. New York: McGraw-Hill Irwin, 2008. Chapters 24 - 25.

Chapter 24

Portfolio Performance Evaluation

Chapter 24 evaluates various risk-adjusted return measures used by portfolio managers. The process of decomposing portfolio returns into the various components of the portfolio-building process is presented.

Keywords

Appraisal ratio
Asset allocation decisions
Comparison universe
Information ratio
Jensen measure
M-square measure

Morningstar ratings
Performance attribution
Sector analysis
Style analysis
Treynor measure

Learning Objectives

1. Through calculations compare and contrast time-weighted returns with dollar-weighted returns.
2. Through calculations compare and contrast the following risk-adjusted performance measures: Sharpe measure; Treynor measure; Jensen measure; the information ratio; and the M^2 measure.
3. Describe why hedge fund trading strategies can complicate the interpretation of risk-adjusted performance measures.
4. Explain why the value of perfectly timing the S&P 500 portfolio is equivalent to holding a call option on the equity portfolio.
5. Understand Sharpe's method of uncovering styles in mutual fund asset allocation.

Chapter 25

International Diversification

Chapter 25 expands the concepts and theories discussed thus far to international markets. One of the important implications of global investing is the impact on portfolio value brought about by changes in foreign exchange rates. Another important implication of global investing is the potential benefit of increased diversification. The chapter illustrates that international indexes are available for passive investing purposes.

Keywords

Country selection
Country-specific risk
Covered interest arbitrage
Currency selection

Exchange rate risk
Home country bias
Interest rate parity
Political risk

Learning Objectives

1. Argue why an exclusive U.S. focus is shortsighted from the standpoint of portfolio risk and reward.
2. Explain exchange rate risk and its role in international investing.
3. Identify the components of country-specific risk.
4. Summarize the evidence of the benefits from international investing for both passive and active investors.

Topic 11: Options and the Black-Scholes Option Pricing Model

Readings

- Bodie, Zvi, Alex Kane, and Alan J. Marcus. *Investments*. 8th ed. New York: McGraw-Hill Irwin, 2008. Chapters 20 - 21.

Chapter 20

Option Markets: Introduction

Chapter 20 describes the characteristics of options, the terminology used in the options' markets, payoffs and profits to option owners and writers, and the put call parity relationship. Also discussed are assets with embedded options such as callable bonds, warrants, and collateralized loans. The chapter explains how to calculate potential profits resulting from various option trading strategies and formulate portfolio management strategies to modify the risk-return attributes of the portfolio.

Keywords

American option	Futures options
Asian options	In-the-money
At-the-money	Index options
Barrier options	Lookback options
Callable bonds	Option Clearing Corporation
Collars	Out-of-the-money
Collateralized loans	Protective puts
Covered calls	Put-call parity theorem
Currency translated options	Spreads
Digital options	Straddles
European options	Strike price
Exercise price	Warrants
Foreign currency options	

Learning Objectives

1. Define the following features of options: calls; puts; in-the-money versus out-of-the-money versus at-the-money; American versus European options; the Clearing Corporation; and options on assets other than common stock.
2. Calculate the value of call and put options at expiration.
3. Understand the following option strategies: protective put; covered call; straddle; spread; and collar.
4. Understand and be able to calculate the put-call parity relationship.
5. Describe the embedded option attributes in the following securities: callable bonds; convertible bonds; warrants; collateralized loans; levered equity; and risky debt.

6. Describe the following exotic options: Asian options; barrier options; lookback options; currency translated options; and digital options.

Chapter 21 Option Valuation

Chapter 21 examines factors affecting the value of an option, determination of option pricing in a two-state world (binomial option pricing), hedge ratios, and the Black-Scholes option-pricing model. Portfolio insurance techniques are also presented. The chapter concludes with a presentation of a hedging application using mispriced options.

Keywords

Binomial model	Historical volatility
Black-Scholes option pricing model	Implied volatility
Delta	Option elasticity
Gamma	Portfolio insurance
Hedge ratio	Time value

Learning Objectives

1. Describe the determinants of call option value.
2. Define the optimal early exercise strategy for American call and put options.
3. Describe the binomial approach to option pricing.
4. List the inputs to the Black-Scholes option pricing formula.
5. Explain the difference between historical volatility and implied volatility.
6. Understand how dividend payments impact the valuation of call and put options.
7. Describe the hedge ratio (or delta) of an option.
8. Explain dynamic hedging, using portfolio insurance as an example.
9. Understand the importance of gamma in dynamic hedging.

Topic 12: Other Derivatives and Market Strategies

Readings

- Bodie, Zvi, Alex Kane, and Alan J. Marcus. *Investments*. 8th ed. Boston: McGraw-Hill Irwin, 2008, Chapters 22 - 23.

Chapter 22

Futures Markets

Chapter 22 describes the mechanics of futures markets including the strategies, risks, and pricing of futures contracts. The chapter provides background on stock index contracts and how these contracts can be used for hedging and speculation.

Keywords

Basis	Hedging
Basis risk	Long position
Calendar spread	Maintenance margin
Cash delivery	Marking to market
Clearinghouse	Normal backwardation
Contango	Open interest
Convergence property	Short position
Cost-of-carry relationship	Speculating
Forward contract	Spot-futures parity theorem
Futures price	

Learning Objectives

1. Define the following features of futures contracts and futures markets: long positions; short positions; the role of the clearinghouse; open interest; marking to market; margin; cash delivery versus actual delivery; and regulation and taxation.
2. Compare and contrast hedging with speculating.
3. Describe basis risk.
4. Understand the spot-futures parity theorem.
5. Explain the relationship between futures prices and expected spot prices under the expectations hypothesis; normal backwardation; contango; and modern portfolio theory.

Chapter 23

Futures and Swaps: Markets and Applications

Chapter 23 discusses the various stock index futures as well as market applications of futures index arbitrage, hedging of foreign exchange risk, hedging of interest rate risk, and the use of interest rate swaps.

Keywords

Cross-hedging

Fair swap price

Foreign exchange swap

Index arbitrage

Price value of a basis point

Program trading

Learning Objectives

1. Calculate interest rate parity and understand the conditions that would lead to its violation.
2. Define the hedge ratio in an exchange rate risk scenario.
3. Explain how stock index futures contracts are traded.
4. Use stock index futures contracts to create a synthetic stock-index position.
5. Describe index arbitrage.
6. Define the price value of a basis point.
7. Describe the characteristics of the swap contract.
8. Describe the impact of credit risk on pricing.
9. Understand the impact of storage costs on the value of futures contracts.

Action Words

In each of the above learning objectives, action words are used to direct your study focus. Below is a list of all action words used in the study guide, along with definitions and two examples of usage — in a sample question and in a description. Should you not understand what is required for any learning objective, we suggest you refer to the table below for clarification.

Term	Definition	Sample Question	Example of Term Use
Analyze	Study the interrelations	<p>George has identified an opportunity for a convertible arbitrage reverse hedge. What risks are associated with this hedge?</p> <ul style="list-style-type: none"> A. The convertible may remain overvalued, causing the positive cash flow to harm the position's return profile. B. The short convertible may be called in and the position must be delivered, forcing the hedge to be unwound at an inopportune time. C. The implied volatility may decrease, lowering the bond's value. D. The implied volatility may increase, lowering the bond's value. 	<p>You have to analyze the positions and factors impacting them.</p> <p>Correct Answer: B</p>
Apply	Make use of	<p>Alicia Weeks, CFA, Real Estate Investment Advisor, works in an Asian country where there are no securities laws or regulations. According to CFA Institute Standard I, Fundamental Responsibilities, Alicia:</p> <ul style="list-style-type: none"> A. must adhere to the standards as defined in a neighboring country that has the strictest laws and regulations. B. need not concern herself with ethics codes and standards. C. must adhere to the CFA Institute's codes and standards. D. must adhere to the standards as defined in a neighboring country that has the least strict laws and regulations. 	<p>You have to apply the CFA Institute Standard I to find the correct answer.</p> <p>Correct Answer: C</p>
Argue	Prove by reason or by presenting the associated pros and cons; debate	<p>Why did the shape of the supply curve for venture capital funds change after 1979?</p>	<p>You have to describe how the curve has changed AND argue why it changed by providing reasons and supporting the reasons with statements of facts (e.g., change in regulations.)</p>

Term	Definition	Sample Question	Example of Term Use
Assess	Determine importance, size, or value	<p>How are lower capital gains taxes expected to impact firm commitments?</p> <p>A. Through increased supply of capital, firm commitments are expected to rise. B. Through decreased supply of capital, firm commitments are expected to rise. C. Through decreased after-tax return on venture investments, firm commitments are expected to rise. D. Through increased after-tax return on venture investments, firm commitments are expected to decline.</p>	<p>You must assess the significance of the change in the tax rate for firm commitments.</p> <p>Correct Answer: A</p>
Calculate	Use a mathematical formula to determine a result	<p>A T-bill has a face value of \$10,000 and sells for \$9,800. If the T-bill matures in 90 days, what is its effective annual yield?</p> <p>A. 8.18% B. 8.26% C. 8.34% D. 8.54%</p>	<p>You have to calculate the effective annual yield.</p> <p>Correct Answer: D</p>
Classify	Arrange or organize according to a class or category	<p>Classify compliance issues considered by examiners when investigating firms that market private equity securities.</p>	<p>You have to correctly classify the aspects of private equity firms relating to the various compliance issues.</p>
Compare	Describe similarities and differences	<p>Which of the following least accurately compares the Sharpe and Teynor ratios?</p> <p>A. Both ratios contain excess return in the numerator B. Both ratios express a measure of return per unit of some measure of risk C. The Sharpe ratio is based on total risk while the Treynor ratio is based on systematic risk D. The Sharpe ratio is the inverse of the Treynor ratio</p>	<p>You have to compare the three approaches based on their most important similarities and their most important differences</p> <p>Correct Answer: D</p>

Term	Definition	Sample Question	Example of Term Use
Compare and Contrast	Examine in order to note similarities or differences	<p>A comparison of monthly payments and loan balances of the constant payment mortgage with the constant amortization mortgage with the same loan terms will show that:</p> <ul style="list-style-type: none"> A. the initial payment will be the same. B. the payments of the constant payment mortgage are initially greater than those of the constant amortization mortgage, but at some time period the payments of the constant payment mortgage become less. C. the present value of the payment streams of the two loan types are the same. D. the constant payment mortgage loan balance exceeds that of the constant amortization mortgage during the first six months of the loan. 	<p>You have to compare indices to arrive at the answer.</p> <p>Correct Answer: C</p>
Compute	Determine an amount or number	<p>The "asked" discount yield on a T-bill is 5%. What is the asked price of the bill if it matures in 60 days and has a face value of \$10,000?</p> <ul style="list-style-type: none"> A. \$9,757 B. \$9,797 C. \$9,837 D. \$9,917 	<p>You have to compute a value from a set of inputs.</p> <p>Correct Answer: D</p>
Construct	Make or form by combining or arranging parts or elements	<p>A reverse convertible arbitrage hedge consists of a:</p> <ul style="list-style-type: none"> A. short convertible position plus a put option on the stock. B. long convertible position plus a put option on the stock. C. short convertible position plus a call option on the stock. D. short convertible position plus a long position in the stock. 	<p>You have to combine positions to construct the hedge.</p> <p>Correct Answer: D</p>
Contrast	Expound on the differences	<p>Which of the following best characterizes a difference between Value at Risk (VaR) and Modified Value at Risk?</p> <ul style="list-style-type: none"> A. Modified VaR is expressed as a percent while VaR is a dollar value B. Modified VaR uses a user defined confidence interval while VaR uses a 99% interval C. Modified VaR incorporates non-normality while traditional VaR assumes normality D. Modified VaR is for a single trading period while traditional VaR is multiple period 	<p>You have to contrast the assumptions of the first model to those of the second model so that the differences are clear.</p> <p>Correct Answer: C</p>

Term	Definition	Sample Question	Example of Term Use
Critique	Evaluate with reasoned judgment	<p>Compared with ranking investment opportunities using NPV, which of the following best describes the appropriateness of the IRR approach?</p> <p>A. The IRR approach does not rank different sized projects as well B. The IRR approach requires the user to supply an interest rate C. The IRR approach requires annuity computations D. The IRR approach does not consider future cash flows</p>	<p>You must critique the various risk measures so that the advantages and disadvantages have been enumerated and justified.</p> <p>Correct Answer: A</p>
Defend	To support or maintain through argument; justify	<p>Justify the use of an adjusted stochastic.</p>	<p>You must defend the use of an adjusted stochastic instead of a traditional stochastic.</p>
Define	State the precise meaning	<p>The interest rate charged by banks with excess reserves at a Federal Reserve Bank to banks needing overnight loans to meet reserve requirements is called the:</p> <p>A. prime rate. B. discount rate. C. federal funds rate. D. call money rate.</p>	<p>You have to define, in this case, the federal funds rate.</p> <p>Correct Answer: C</p>
Describe	Convey an idea or characterize	<p>Which of the following words best describes expected return?</p> <p>A. Spread B. Average C. Spread squared D. Average squared</p>	<p>You need to choose the word that best describes the concept from a list.</p> <p>Correct Answer: B</p>
Determine	Establish or ascertain definitively, as after consideration, calculation or investigation	<p>Assume you sold short 100 shares of common stock at \$50 per share. The initial margin is 60%. What would be the maintenance margin if a margin call was made at a stock price of \$60?</p> <p>A. 25% B. 33% C. 41% D. 49%</p>	<p>You have to determine a precise value from a set of inputs.</p> <p>Correct Answer: B</p>

Term	Definition	Sample Question	Example of Term Use
Differentiate	Constitute the distinction between; distinguish	<p>What type of convertible hedge entails shorting a convertible and going long in the underlying stock?</p> <ul style="list-style-type: none"> A. Call option hedge B. Traditional convergence hedge C. Implied volatility convergence hedge D. Reverse hedge 	<p>You have to differentiate one type of hedge from another.</p> <p>Correct Answer: D</p>
Discuss	Examine or consider a subject	Discuss the limitations of private equity data.	<p>You have to present a discussion of a set of ideas in a list or paragraph.</p>
Distinguish	Separate using differences	<p>Which of the following best distinguishes between the covariance and the correlation coefficient?</p> <ul style="list-style-type: none"> E. The covariance indicates the extent to which two assets move together or apart F. The correlation coefficient is the expected product of the deviations of two variables G. The covariance is the square root of the correlation coefficient H. The correlation coefficient is scaled and bounded between +1 and -1 	<p>You have to distinguish between risk measurement approaches based on their assumptions regarding the distribution of returns.</p> <p>Correct Answer: D</p>
Explain	Illustrate the meaning	<p>1. Explain why return on assets (ROA) rather than return on equity (ROE) might be the preferred measure of performance in the case of hedge funds.</p> <p>or</p> <p>2. Which of the following best explains risk from the standpoint of investment?</p> <ul style="list-style-type: none"> A. Investors will lose money. B. Terminal wealth will be less than initial wealth. C. Final wealth will be greater than initial wealth. D. More than one outcome is possible. 	<p>1. You have to place a series of thoughts together as an explanation of a term or issue.</p> <p>2. You need to identify the term that best explains a term or issue.</p> <p>Correct Answer: D</p>
Formulate	State or reduce to a formula	<p>The holding period return (HPR) on a share of stock is equal to:</p> <ul style="list-style-type: none"> A. the capital gain yield minus the inflation rate over the period. B. the capital gain yield plus the dividend yield over the period. C. the current yield plus the dividend yield. D. the dividend yield plus the risk premium. 	<p>You have to formulate the meaning of some term or issue.</p> <p>Correct Answer: B</p>

Term	Definition	Sample Question	Example of Term Use
Identify	Establish the identity	<p>The investments that have historically performed best during periods of recession are:</p> <ul style="list-style-type: none"> A. commodities. B. treasury bills. C. stocks and bonds. D. gold. 	<p>You have to identify the term that best meets the criterion of the question.</p> <p>Correct Answer: C</p>
Illustrate	Clarify through examples or comparisons	<p>For two types of convergence hedges, what situations present profitable opportunities, how are the hedges set up, and what are the associated risks?</p>	<p>You have to provide an example for each hedge or compare the two to illustrate how they work.</p>
Interpret	Explain the meaning	<p>Your certificate of deposit will mature in one week, and you are considering how to invest the proceeds. If you invest in a 30-day CD, the bank will pay you 4%. If you invest in a 2-year CD, the bank will pay you 6% interest. You should choose the:</p> <ul style="list-style-type: none"> A. 30-day CD, no matter what you expect interest rates to do in the future. B. 2-year CD, no matter what you expect interest rates to do in the future. C. 30-day CD if you expect that interest rates will fall in the future. D. 2-year CD if you expect that interest rates will fall in the future. 	<p>You have to interpret the features of an investment scenario.</p> <p>Correct Answer: D</p>
List	Create a series of items	<p>List the determinants of real interest rates.</p>	<p>You have to differentiate from a list those items that are consistent with the question.</p>
Name	State a word by which an entity is designated or distinguished from others	<p>As of December 31, 1999, which class of mutual funds had the largest amount of assets invested?</p> <ul style="list-style-type: none"> A. Stock funds B. Bond funds C. Mixed asset classes, such as asset allocation funds D. Money market funds 	<p>You need to name the correct statement or phrase from a group of potential answers.</p> <p>Correct Answer: A</p>

Term	Definition	Sample Question	Example of Term Use
Outline	Summarize tersely	<p>Which of the following best characterizes the steps in computing a geometric mean return based on a series of periodic returns from T time periods?</p> <p>A. Add one to each return, add them together, divide by T and subtract one B. Add one to each return, multiply them together, divide by T and subtract one C. Add one to each return, add them together, take the Tth root and subtract one D. Add one to each return, multiply them together, take the Tth root and subtract one</p>	<p>You must outline the study's most important findings rather than explain them in detail.</p> <p>Correct Answer: D</p>
Price	State the amount by which an asset is valued or value an asset in monetary terms	<p>Widgets Inc. paid a dividend of \$2.50 last year. Required return on Widget Inc.'s stock is determined to be 13% per year, and the dividend is expected to grow at 3% per year forever. Determine a fair market price for Widget Inc.'s stock, assuming the constant dividend growth model holds.</p> <p>A. \$20.25 B. \$25.75 C. \$31.25 D. \$36.75</p>	<p>You have to price, according to a formula, a value from a set of inputs.</p> <p>Correct Answer: B</p>
Rank	Determine relative position	<p>According to the analysis by Gompers and Lerner, which of the following best ranks, from low to high (by percentage), the four outcomes for total venture-backed firms?</p> <p>A. Liquidated, IPOs, merged, and continued private B. IPOs, liquidated, merged, and continued private C. Merged, liquidated, continued private, and IPOs D. Continued private, IPOs, merged, and liquidated</p>	<p>You have to choose the correct ranking of a number (4) of items according to a particular criterion (percentage).</p> <p>Correct Answer: A</p>
Recommend	Indicate as preferred	<p>Sue Arnold works for a hedge fund and has been asked to develop a methodology for the fund to measure and report on the potential tendency of various investment strategies to have a much higher probability of large negative outcomes than large positive outcomes. Which of the following would be the most appropriate risk measure for Ms. Arnold to suggest in response to this concern?</p> <p>E. Drawdown F. Skewness G. Kurtosis H. Variance</p>	<p>You have to recommend which procedure reflects best practices.</p> <p>Correct Answer: B</p>

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Relate	Show or establish logical or causal connection	Which of the following effects does NOT help to explain growth in the venture capital industry? A. Amendments to the prudent man rule B. The rise of limited partnerships as an organizational form C. Decline in the valuations of small capitalization stocks D. The activities of investment advisors in the venture capital market	You must relate effects or factors (e.g., the prudent man rule) to another result or concept (e.g., growth in an industry). Correct Answer: C
Solve	Find a solution	Diversified Portfolios had year-end assets of \$279,000,000 and liabilities of \$43,000,000. If Diversified's net asset value was \$36.37, how many shares does the fund have? A. 4,938,372 B. 5,713,372 C. 6,488,372 D. 7,263,372	You have to place various inputs into a formula and solve for the unknown. Correct Answer: C
State	Set forth in words or declare	State the main risks faced by distressed securities investors.	You have to present a list or set of sentences that states main ideas.
Summarize	Cover all the main points succinctly	Summarize the performance of trend and momentum strategies, and compare their performance to the buy-and-hold strategy.	You have to summarize a longer discussion or complicated concept or set of results by focusing on the main ideas.
Understand	Perceive and comprehend nature and significance; grasp meaning	Which of the following would increase the net asset value of a mutual fund share, assuming all other things remain unchanged? A. An increase in the number of fund shares outstanding B. An increase in the fund's accounts payable C. A change in the fund's management D. An increase in the value of one of the fund's stocks	You have to use reasoning to illustrate an understanding of a specific issue. Correct Answer: D
Use	Apply for a purpose or employ	Illustrate the financial benefits of merger arbitrage using an actual merger transaction.	You have to use facts or values from a situation to answer a specific question.

Term	Definition	Sample Question	Example of Term Use
Value	Assign or calculate numerical quantity	<p>Multiple Mutual Fund had year-end assets of \$457,000,000 and liabilities of \$17,000,000. There were 24,300,000 shares in the fund at year-end. What was Multiple Mutual's net asset value?</p> <p>A. \$11.26 B. \$18.11 C. \$24.96 D. \$31.81</p>	<p>You have to determine a numerical value from a set of inputs and a formula.</p> <p>Correct Answer: B</p>