2009/2010 CAIA Prerequisite Diagnostic Review (PDR) And Answer Key

Form B

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 you are expected to know prior to becoming a Level I candidate.

The CAIA Prerequisite Program organizes these foundations into topics and learning objectives in a way similar to its Level I and Level II programs. All CAIA candidates will be assumed to have an understanding of the prerequisite material, and candidates can expect to incorporate this materials 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. We recommend that you take the review under CAIA exam conditions -- a two hour (120 minute) time limit and using no outside reference materials.

Posted September 2009

2009/2010 CAIA Prerequisite Diagnostic Review (PDR) And Answer Key

Form B

1. The stated annual interest rate offered by a bank is 8.45%. What is the approximate difference between the effective annual rate using continuous compounding and effective annual rate using monthly compounding?

   A. 0.095%
   B. 0.074%
   C. 0.053%
   D. 0.032%

2. To cover college tuition payments for a child, a couple estimates having to make payments of $30,000 a year over four consecutive years, the first payment due exactly five years from today. Earning 8% annually, what comes closest to the amount the couple must invest today to meet their tuition goal?

   A. $64,920.33
   B. $67,625.34
   C. $70,330.35
   D. $73,035.36

3. A company plans to spend $5 million today on advertising, with the expectation that the investment will produce cash flows of $400,000 in perpetuity. What is the advertising project's internal rate of return?

   A. 5%
   B. 6%
   C. 7%
   D. 8%

4. A particular investment is accepted after its net present value is calculated to be positive. How does the project's internal rate of return compare to the project's required rate of return?

   A. The internal rate of return is greater than the required rate of return
   B. The internal rate of return is equal to the required rate of return
   C. The internal rate of return is less than the required rate of return

5. One sample of 12 randomly selected companies in the S&P 500 had an average annual return of 3.4%, while another sample of 12 randomly selected companies had an average annual return of 4.4%. Which of the following statements is MOST accurate?

   A. The sample of interest is all companies in the S&P 500
   B. The sample of interest is all US companies
   C. The population of interest is all companies in the S&P 500
   D. The population of interest is all US companies

6. Which of the following conditions is TRUE of a normal distribution?

   I. The kurtosis of the distribution is near 3
   II. Approximately 95% of all observations lie within two standard deviations of the mean
   III. The mean and median are approximately equal

   A. I and II only
   B. I and III only
   C. II and III only
   D. I, II, and III

7. A distribution of data points is skewed right with no apparent outliers. Which is the following statement is most likely to be TRUE?

   A. The median and the mean are equal
   B. The median is less than the mean
   C. The third quartile lies closer to the median than the first quartile
   D. The mean of the distribution is greater than zero

8. Six candidates audition for three vacancies on the Board of Directors at a particular company. How many ways can they be appointed if the positions are identical and how many ways can they be appointed if the positions are instead unique?

   A. 20, 120
   B. 20, 720
   C. 120, 720
   D. 720, 120

9. A six-sided die is rolled once. Let Event A = a roll of 2. Let Event B = a roll of an even number. Let Event C = a roll that is less than 5. Which pair of the events is independent?

   A. Events A and B
   B. Events A and C
   C. Events B and C

10. The table below represents possible stock prices of a company at the end of the year. Assuming the events are independent of one another, which of the following is closest to the variance (VAR) of stock prices?

Probability:	0.1	0.5	0.4
Stock price:	$3.00	$2.00	$1.00

   A. Var = 0.41
   B. Var = 0.56
   C. Var = 0.71
   D. Var = 0.86

11. What does it mean to say that three events are mutually exclusive?

   A. Only one event can occur at a time
   B. The number of possible events is three
   C. Each event occurs with the same probability
   D. Each event does not occur with the same probability

12. The probability that Firm A finishes a month with a positive stock return is 0.7, while the probability that Firm B finishes a month with a positive stock return is 0.8. The probability that at least one company finishes with a positive stock returns is 0.98. What is the probability that both firms finish with positive returns?

   A. 0.58
   B. 0.56
   C. 0.54
   D. 0.52

13. An investor puts 60% of her funds in Company A, whose probability of going bankrupt is 0.005, and the rest of her funds in Company B, whose probability of going bankrupt is 0.010. If one of the companies goes bankrupt, what, approximately, is the probability that it was Company A?

    A. 0.714
    B. 0.571
    C. 0.429
    D. 0.286

14. Test A is normally distributed with a mean of 500 and a standard deviation of 100. Test B is normally distributed with a mean of 18 and standard deviation of 6. A student scored a 677 on Test A and a 29 on Test B. Relative to their respective distributions, which score is better?

    A. The score on Test A
    B. The score on Test B
    C. The scores are equivalent

15. Third-quarter profit for a company is expected to lie in the interval between -$2,000 and $6,000. Each outcome between the two boundaries is treated as equally likely, forming a continuous uniform distribution. What is the expected value of third-quarter profit?

    A. $1,000
    B. $2,000
    C. $3,000
    D. $4,000

Assume that X is a discrete random variable with exactly four outcomes, given by 3, 4, 5, and 6, and that values *r, s*, and *t* are known but intentionally left out of the table.

X	Probability Function	Cumulative Distribution Function
3	0.05	0.05
4	0.15	*S*
5	0.25	*T*
6	*r*	1

16. What is the value of *r* in the above table?

A. 0.65
B. 0.55
C. 0.45
D. 0.35

Use the data in the table below to answer the following question.

Mean and Standard Deviation of Four Portfolios

Portfolio:	A	B	C	D
Expected Annual Return (%)	10	14	7	16
Standard Deviation of Return (%)	5	10	3	12

17. Suppose that for a return less than 4.5%, a client will need to invade principal. With this in mind, which is the optimal portfolio using Roy's safety-first criterion?

A. Portfolio A
B. Portfolio B
C. Portfolio C
D. Portfolio D

18. Why is the lognormal distribution useful in modeling asset prices?

A. The lognormal distribution and asset prices are both similar to uniform distributions
B. The lognormal distribution and asset prices are both examples of discrete variables
C. The lognormal distribution and asset prices are both bounded to the left by 0
D. The lognormal distribution and asset prices are both bounded to the right by 0

A survey is to be taken to discover employee opinions on satisfaction regarding the quality of their work environment. Consider the following methods of choosing 40 employees from 2,000 total employees of the company.

Method I: Using an alphabetical list of all employees, assign each employee a 4-digit number. Use a random number generator to select 40 random 4-digit numbers and choose those 40 employees.

Method II: Put the names of all males in one hat and all females in another hat. Randomly pick from each hat so the numbers of males and females selected are proportional to the gender of the 2000 employees

19. Which of the following statements BEST describes the methods above?

    A. Method I and Method II are both simple random samples
    B. Method I and Method II are both stratified random samples
    C. Method I is a stratified random sample; Method II is a simple random sample
    D. Method I is a simple random sample; Method II is a stratified random sample

20. A population is given with mean μ and variance σ^2. When the sample size n is large, which of the following is NOT a property of the central limit theorem?

    A. The distribution of the sample means will be approximately normal
    B. The mean of the distribution of sample means is μ
    C. The variance of the distribution of sample means is σ^2/n
    D. The standard deviation of the distribution of sample means is σ/n

21. Assume a company's monthly returns are normally distributed with a population standard deviation of 14%. What is the total width of a 95% confidence interval for the mean monthly return that was generated using 16 independent returns?

    A. 13.72%
    B. 10.28%
    C. 6.86%
    D. 3.44%

22. Which of the following statements is the MOST accurate regarding the use of a 99% confidence level to estimate the population mean return to all Canadian hedge funds?

A. Approximately 99% of intervals generated using identical methods will contain the population mean return of all Canadian hedge funds
B. Approximately 99% of intervals generated using identical methods will contain the sample mean return of all Canadian hedge funds
C. Approximately 99% of Canadian hedge funds will lie within the interval generated using this method
D. Approximately 99% of Canadian hedge funds will be included in the sample using this method

23. Which of the following statements BEST interprets a 0.40 Type II error?

A. There is a 40% chance of rejecting a false null hypothesis
B. There is a 40% chance of rejecting a true null hypothesis
C. There is a 40% chance of failing to reject a false null hypothesis
D. There is a 40% chance of failing to reject a true null hypothesis

24. Which of the following statements BEST interprets the power of a hypothesis test?

A. Power is the probability of incorrectly failing to reject the null hypothesis
B. Power is the probability of incorrectly rejecting the null hypothesis
C. Power is the probability of correctly failing to reject the null hypothesis
D. Power is the probability of correctly rejecting the null hypothesis

25. A large company is concerned that the mean number of hours worked in a week for all employees is greater than 40. A random group of 35 employees yields a sample mean of 41 hours. Which of the following represents the correct pair of hypotheses?

A. H_0 : mean number of weekly hours worked >40; H_a : mean number of weekly hours worked ≤ 40
B. H_0 : mean number of weekly hours worked ≤ 40; H_a : mean number of weekly hours worked > 40
C. H_0 : mean number of weekly hours worked >41; H_a : mean number of weekly hours worked ≤ 41
D. H_0 : mean number of weekly hours worked ≤ 41; H_a : mean number of weekly hours worked > 41

26. A CEO wants to determine if the population variance of the company's daily returns has dropped subsequent to the hiring of a new vice-president. Let σ^2_B equal the variance before the hiring and σ^2_A= equal the variance after the hiring. Which of the null and alternative hypotheses below should the CEO use?

A. $H_o : \sigma^2_B = \sigma^2_A$; $H_a : \sigma^2_B < \sigma^2_A$
B. $H_o : \sigma^2_B = \sigma^2_A$; $H_a : \sigma^2_B > \sigma^2_A$
C. $H_o : \sigma^2_B \neq \sigma^2_A$; $H_a : \sigma^2_B < \sigma^2_A$
D. $H_o : \sigma^2_B \neq \sigma^2_A$; $H_a : \sigma^2_B > \sigma^2_A$

The population variance of daily returns for Mutual Fund X and Mutual Fund Y is compared using the hypotheses below.

$\boldsymbol{H_o : \sigma^2_X = \sigma^2_Y;\ H_a : \sigma^2_X \neq \sigma^2_Y}$

27. Assuming the distribution of daily returns is normally distributed and the samples of daily returns are independent, how should the *F* test statistic be calculated?

A. $F = (s_1/s_2)^2$, with the sample variance for Mutual Fund X equal to s_1
B. $F = (s_1/s_2)^2$, with the sample variance for Mutual Fund Y equal to s_1
C. $F = (s_1/s_2)^2$, with the smaller sample variance equal to s_1
D. $F = (s_1/s_2)^2$, with the larger sample variance equal to s_1

28. The table below represents a sample of daily returns (given in percents) for Portfolio A and Portfolio B. Which of the following statements justifies the use of the Spearman rank correlation coefficient in a test of zero correlation between the daily returns of the portfolios?

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Portfolio A	0.3	4.5	-2.3	-2.6	2.9	-2.4	-3.1
Portfolio B	1.4	2.0	-3.2	-3.8	2.4	-4.9	1.0

A. The data for both portfolios exhibit several positive and negative returns
B. The data for both portfolios do not follow a normal distribution
C. The standard deviations for each portfolio are essentially equal
D. The standard deviations for each portfolio are approximately three percent

29. Given the list of variables X and Y below, a statistician calculates a correlation coefficient of -0.53. How do the italicized points impact the correlation coefficient?

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	***Day 7***	Day 8
Portfolio X	4	13	6	19	13	14	***0***	3
Portfolio Y	12	11	10	12	8	14	***92***	9

A. The italicized points draw the correlation coefficient towards -1
B. The italicized points draw the correlation coefficient towards 0
C. The italicized points draw the correlation coefficient towards 1
D. The italicized point has no impact on the correlation coefficient

30. Which of the following are assumptions of the error term, ε_i, in the linear regression equation below?

$$\boldsymbol{Y_i = b_o + b_1 X_i + \varepsilon_i, \text{ for } i = 1,....,n}$$

A. The errors are uncorrelated with non-constant variance
B. The errors are uncorrelated with constant variance
C. The errors are correlated with non-constant variance
D. The errors are correlated with constant variance

The relationship between X_i, the yearly liters of wine consumed per person, and Y_i, the yearly deaths per 100,000 people from heart disease, is examined using the regression model below.

$$\boldsymbol{Y_i = b_o + b_1 X_i + \varepsilon_i, \text{ for } i = 1,....,n}$$

Estimates of b_o, b_1, and r, the correlation coefficient between X and Y, are:

$$\boldsymbol{b_o = 26.1903 \qquad b_1 = -23.8217 \qquad r = -0.8732}$$

31. For every additional liter of wine consumed per person, what is the estimated change in yearly deaths per 100,000 people from heart disease?

A. -26.1903
B. -23.8217
C. - 0.8732
D. 2.3169

Use the information below to answer the following 4 questions.

An analyst at Firm A compared monthly returns for Firm A to the monthly returns for the S&P 500. The regression results with Firm A's return as the dependent variable and the S&P 500 return as the independent variable are shown below.

Regression Statistics					
Observations	34				
ANOVA	df	SS	MSS	*F*	Significance *F*
Regression	1	0.4921	0.4921	47.529	0
Residual	32	0.3417	0.0104		
Total	33	0.8338			

	Coefficients	Standard Error	*t*-statistic	*p*-value
Intercept	0.1625	0.043	0.3779	0.7080
Slope	0.5811	0.084	6.8941	0

32. Using a significance level of 0.05, which of the following statements correctly assesses the significance of the intercept and the slope of the regression equation between monthly returns of Firm A and monthly returns for the S&P 500?

    A. The intercept is not significant; The slope is significant
    B. The intercept is significant; The slope is not significant
    C. Both the intercept and the slope are significant
    D. Both the intercept and the slope are not significant

33. In a given month, the returns for the S&P 500 are 0.1%. Which of the following correctly calculates an expected value for the monthly returns of Firm A?

    A. 0.5811 + 0.1625(.1) = 0.59735
    B. 0.5811 - 0.1625(.1) = 0.56485
    C. 0.1625 + 0.5811(.1) = 0.07436
    D. 0.1625 - 0.5811(.1) = -0.04186

34. Which of the following equations indicates a 99% confidence interval for the regression coefficient of the increase in Firm A monthly returns per increase in monthly returns for the S&P 500?

    A. 0.5811 ± 2.7385 (0.084)
    B. 0.1625 ± 2.7385 (0.043)
    C. 0.5811 ± 2.4487 (0.084)
    D. 0.1625 ± 2.4487 (0.043)

35. Which of the following statements regarding the coefficient of determination is accurate?

A. Monthly returns of the S&P 500 explain roughly 71% of the variability in Firm A's returns
B. Monthly returns of the S&P 500 explain roughly 59% of the variability in Firm A's returns
C. Firm A's returns explain roughly 71% of the variability of monthly returns of the S&P 500
D. Firm A's returns explain roughly 59% of the variability of monthly returns of the S&P 500

Use the table below to answer the following 4 questions

A multiple regression analysis is used to estimate a mutual fund's current monthly returns (Y_i) given returns on the NYSE (X_1) Index and NASDAQ (X_2) Index from the previous month. The estimates for the coefficients and their standard errors are listed below.

	Coefficient	Standard Error
Intercept	-0.052	0.410
X_1	0.374	0.214
X_2	-0.491	0.150
$n = 603$		

The multiple regression model $\boldsymbol{Y_i = b_0 + b_1 X_{1,i-1} + b_2 X_{2,i-1}}$ is used.

36. Do returns from the NYSE Index and NASDAQ Index and provide statistical significance at the 0.05 level?

A. NASDAQ returns have statistical significance, but NYSE returns do not
B. NYSE returns have statistical significance, but NASDAQ returns do not
C. Both NASDAQ and NYSE returns have statistical significance
D. Neither NASDAQ nor NYSE returns have statistical significance

37. Which of the following pairs of hypotheses and test statistics should be used to determine if NYSE returns have statistical significance?

A. $H_o : X_2 = 0, H_a : X_2 \neq 0$; use the *F* test statistic
B. $H_o : b_1 = 0, H_a : b_1 \neq 0$; use the *F* test statistic
C. $H_o : X_2 = 0, H_a : X_2 \neq 0$; use the *t* test statistic
D. $H_o : b_1 = 0, H_a : b_1 \neq 0$; use the *t* test statistic

38. Suppose the p-value reported for the estimated coefficient on X_2 is 0.09587. Which of the following gives the best interpretation of 0.09587?

A. 0.09857 is the probability that the null hypothesis should be rejected
B. 0.09857 is the probability that the null hypothesis should not be rejected
C. 0.09587 is the largest level of significance at which we can reject a null hypothesis that the population value of the coefficient is 0 for a two-sided test
D. 0.09587 is the smallest level of significance at which we can reject a null hypothesis that the population value of the coefficient is 0 for a two-sided test

39. Suppose that in a certain month, the return for the NYSE Index was 0.01 and the return for the NASDAQ Index was 0.02. How would we use these values in the regression framework to estimate the expected return for the mutual fund's return?

A. $Y_i = -0.052 - 0.374(0.01) + 0.481(0.02)$
B. $Y_i = -0.052 + 0.374(0.01) - 0.481(0.02)$
C. $Y_i = -0.052(0.01) - 0.374(0.02)$
D. $Y_i = -0.052(0.01) + 0.374(0.02)$

40. Which of the following is the correct way to distinguish between conditional and unconditional heteroskedasticity?

A. Conditional heteroskedasticity is correlated with the values of the independent variables while unconditional heteroskedasticity is not
B. Unconditional heteroskedasticity is correlated with the values of the independent variables while conditional heteroskedasticity is not
C. Conditional heteroskedasticity is correlated with the values of the dependent variables while unconditional heteroskedasticity is not
D. Unconditional heteroskedasticity is correlated with the values of the dependent variables while conditional heteroskedasticity is not

41. A regression procedure is impacted by positive serial correlation. How are the *t*-statistics of the regression coefficients influenced and what test-statistic is used to determine if the serial correlation is significant?

A. Positive serial correlation typically deflates *t*-statistics of estimated regression coefficients and a Breusch-Pagan test-statistic is used
B. Positive serial correlation typically deflates *t*-statistics of estimated regression coefficients and a Durbin-Watson test-statistic is used
C. Positive serial correlation typically inflates *t*-statistics of estimated regression coefficients and a Breusch-Pagan test-statistic is used
D. Positive serial correlation typically inflates *t*-statistics of estimated regression coefficients and a Durbin-Watson test-statistic is used

42. Omitting a variable is a common form of model misspecification. Which of the following is a potential flaw in a regression procedure generated without including a known significant variable?

A. The *F*-test statistic is more likely to be significant in the regression procedure generated without including a known significant variable
B. The standard errors of the regression coefficients would be consistent and unbiased in the regression procedure generated without including a known significant variable
C. The estimates of the regression coefficients would be inconsistent and biased in the regression procedure generated without including a known significant variable
D. The potential for multicollinearity is unaccounted for in the regression procedure generated without including a known significant variable

Use the table below to answer the following 2 questions.

The table below shows the regression estimates of a linear trend of company profit, January 2009-December 2010, using the model $\boldsymbol{Profit_t = b_0 + b_1 t + \epsilon_t}$.

Regression Statistics

R-squared	0.5620
Standard Error	1604
Durbin Watson	1.2446
Observations	24

	Coefficients	Standard Error	*t*-statistic
Intercept	3296.74	675.68	4.879
Trend	251.26	47.29	5.313

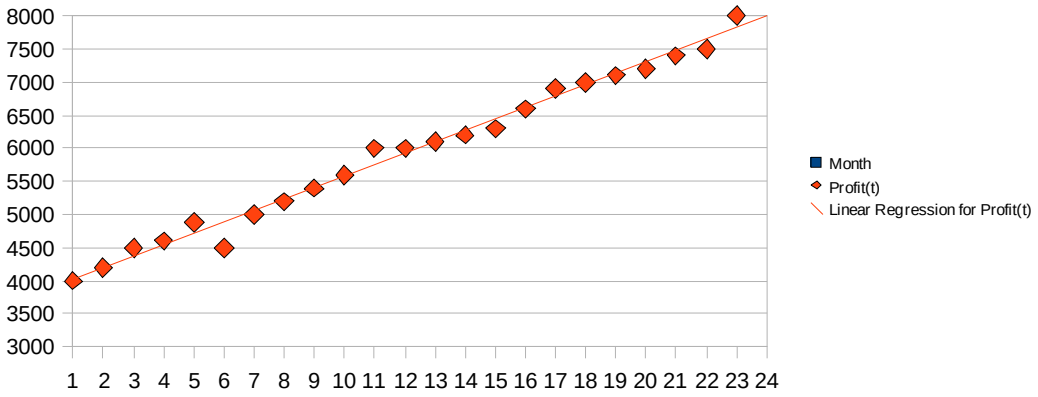
43. What is the model's prediction of company profit for June 2010?

A. $7,819.42
B. $7,568.16
C. $7,316.90
D. $7,065.64

44. The Durbin-Watson statistic is 1.24. What does this suggest about the model?

A. There is likely positive serial correlation in the model, which makes inference on coefficient estimates inappropriate
B. There is likely positive serial correlation in the model, suggesting a log-linear model would be more appropriate
C. There is likely negative serial correlated in the model, which makes inference on coefficient estimates inappropriate
D. There is likely negative serial correlation in the model, suggesting a log-linear model would be more appropriate

45. A plot of company profit, Profit (t), is shown by month below with an estimated trend line. Based on the plot below, does this time series exhibit covariance stationary?



A. No, because the variance appears to grow at a constant rate over time
B. No, because the profit appears to grow at a constant rate over time
C. Yes, because the variance appears to be grow at a constant rate over time
D. Yes, because the profit appears to grow at a constant rate over time

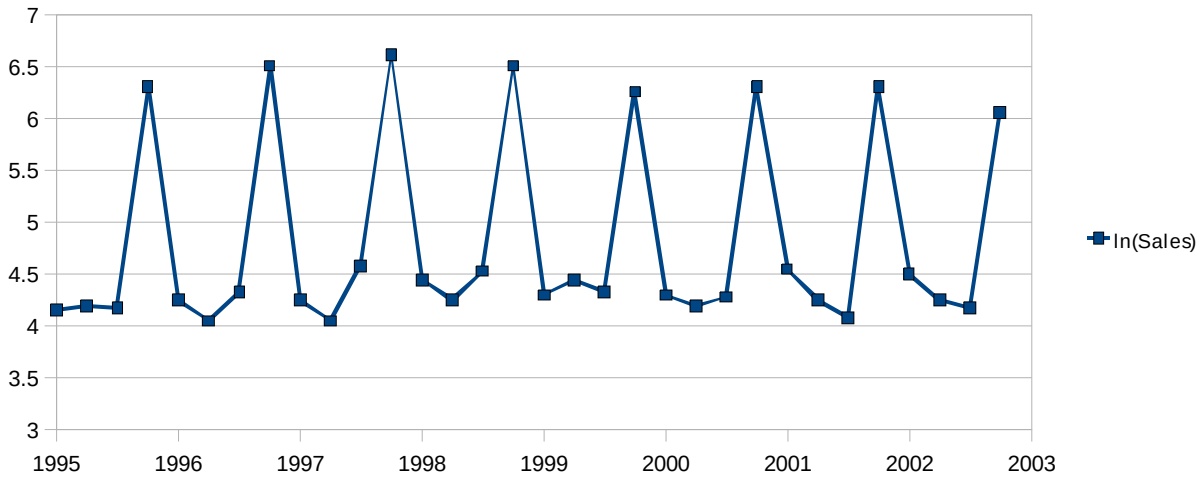
46. What type of model should be used to represent a time series in which the value of the series in one period is the value of the series in the previous period plus an unpredictable error?

A. A first-order autoregressive conditional heteroskedasticity model, (ARCH(1))
B. A first-order autoregressive model, (AR (1))
C. A random walk model
D. A random coefficient model

47. In order to analyze $\ln(Sales_t)$ with an autoregressive model, what should be done to the above time series to make it covariance stationary?

A. Difference the data and model $\Delta\ln(Sales_t) = \ln(Sales_t) - \ln(Sales_{t-1})$
B. Model a 4-quarter moving average
C. Transform $\ln(Sales_t)$ from logarithmic to non-logarithmic values
D. Use a fourth-order autoregressive model, AR(4)

The plot of (ln Sales$_t$) is shown below for using quarterly data from 1995-2002.



48. If it is determined that the log of sales is covariance stationary, which of the models provided is the most appropriate for the above time series?

A. ln Sales$_t$ = b_1(ln Sales$_{t-4}$) + ϵ_t
B. ln Sales$_t$ = b_0 + b_1(ln Sales$_{t-4}$) + ϵ_t
C. ln Sales$_t$ = b_1(ln Sales$_{t-1}$) + b_1(ln Sales$_{t-2}$) + b_1(ln Sales$_{t-3}$) + b_1(ln Sales$_{t-4}$) + ϵ_t
D. ln Sales$_t$ = b_0 + b_1(ln Sales$_{t-1}$) + b_1(ln Sales$_{t-2}$) + b_1(ln Sales$_{t-3}$)+ b_1(ln Sales$_{t-4}$) + ϵ_t

49. How is the correlation between a pair of assets related to portfolio risk?

A. With a correlation of -1 between assets, portfolio risk can be reduced to zero
B. With a correlation of 0 between assets, portfolio risk can be reduced to zero
C. With a correlation of +1 between assets, portfolio risk can be reduced to zero

50. A pair of assets has betas of 1.4 and 1.9 with residual standard deviations from the market model of 3 for the first asset and 5 for the second. The standard deviation of the market is 10. Which of the following is closest to the correlation between the two assets?

A. 0.80
B. 0.85
C. 0.90
D. 0.95

51. Which of the following is TRUE regarding the ratio of the yield on municipal bonds (tax-free bonds) to the yield on otherwise similar taxable bonds?

A. One plus this ratio defines the tax bracket that would make the yield on municipal bonds equal to the after-tax yield on otherwise similar taxable bonds
B. The lower this ratio, the more advantageous it is to hold municipal debt
C. One minus this ratio defines the tax bracket that would make the yield on municipal bonds equal to the after-tax yield on otherwise similar taxable bonds
D. One divided by this ratio defines the tax bracket that would make the yield on municipal bonds equal to the after-tax yield on otherwise similar taxable bonds

52. What is the price-weighted index of these three stocks?

Stock	Price	Number of shares outstanding
Stock A	$40	200
Stock B	$70	500
Stock C	$10	600

A. 30
B. 40
C. 55
D. 60

53. Which of the following describes a firm commitment arrangement?

A. An investment banker who buys the stock from the company and then resells the stock to the public
B. An investment banker who agrees to help the firm sell the stock at a favorable price
C. An investment banker who fixes the commission that it will choose
D. An investment banker who agrees to sell small amounts of a firm's issue without incurring substantial floatation costs

54. Suppose you purchased XYZ stock at $50 per share. The stock is currently selling at $65. Which of the following types of orders will best protect your gains?

A. A stop-buy order
B. A limit-sell order
C. A stop-loss order
D. A limit market order

55. You purchase 200 shares of common stock on margin at a price of $70 per share from your broker. If the initial margin is set at 55%, how much did you borrow?

A. $6,000
B. $6,300
C. $7,000
D. $7,700

56. Suppose you purchased 100 shares of common stock on margin at $45 per share. The initial margin is 50%. Which of the following comes closest to the maintenance margin if a margin call is made at a stock price of $30?

A. 25%
B. 33%
C. 45%
D. 55%

57. Suppose you sell short 100 shares of common stock at $45 per share with initial margin at 50%. Which of the following comes closest to your rate of return if you repurchase the stock at $40 per share?

A. 18%
B. 20%
C. 22%
D. 25%

58. A mutual fund reported year-end assets of $825 million, a net asset value (NAV) of $32.20, and 24.845 million shares outstanding. Which of the following comes closest to the fund's year-end liabilities?

A. $10 million
B. $15 million
C. $20 million
D. $25 million

59. Which of the following comes closest to the market conversion value of a convertible bond that has a par value of $1,000, a current market price of $850, a conversion ratio of 30, and whose stock trades currently for $29 per share?

A. $ 729
B. $ 810
C. $ 870

D. $1,720

60. An 8% coupon 30-year annual pay bond whose par value is $1,000 is selling for $1,275.30. Which of the following comes closest to the bond's yield to maturity?

A. 6%
B. 7%
C. 8%
D. 9%

61. What characteristic is associated with a high rating from the bond rating agency?

A. A low times interest earned ratio
B. A high fixed coverage ratio
C. A high quick ratio
D. A low current ratio

62. What is the main purpose of the subordination clause in a bond indenture?

A. It restricts the amount of dividends the firm may pay
B. It provides for a sinking fund
C. It specifies the collateral for the bond
D. It restricts the amount of future additional debt the firm may take

63. According to the expectations theory, which of the following comes closest to the expected one-year forward rate in the third year?

A. 7.00%
B. 7.33%
C. 9.00%
D. 11.19%

64. With regard to the term structure of interest rates, which of the following is consistent with the expectations hypothesis?

A. Forward rates are determined by investors' expectations of future interest rates
B. Forward rates, for reasons best explained by risk, exceed expected future interest rates
C. Forward rates, for reasons best explained by risk, are below expected future interest rates

65. Which of the following statements about duration is FALSE?

A. Holding other things constant, the duration of a non-discount bond increases as time to maturity increases
B. Given a particular time to maturity, the duration of a zero-coupon bond increases as the bond's yield to maturity decreases
C. Given a particular time to maturity and yield to maturity, the duration of a bond increases as the bond's coupon rate decreases
D. Given a particular time to maturity, the duration of a coupon bond increases as yield to maturity decreases

66. Bonds A and B have equal duration, but Bond A has higher positive convexity than Bond B. Which statement is TRUE?

A. Bond A has smaller price increases and greater price decreases than Bond B when interest rates fluctuate by larger amounts
B. Bond A has greater price increases and smaller price decreases than Bond B when interest rates fluctuate by larger amounts
C. Bond A has greater price increases and greater price decreases than Bond B when interest rates fluctuate by larger amounts

67. Which term describes the cash flow matching of bonds on a multiperiod basis?

A. A clone SWAP
B. Dedication
C. Subordination

68. A substitution swap is an exchange of bonds undertaken for what purpose?

A. To change the credit risk of a portfolio
B. To extend the duration of a portfolio
C. To profit from apparent mispricing between two bonds

69. A preferred stock will pay a dividend of $2.75 in the upcoming year and does not expect to change its dividend in the future. If you require a return of 10% on this stock, which of the following comes closest to an estimate of the value of the stock?

A. $ 2.75
B. $27.50
C. $30.25
D. $55.00

70. At the end of the next year a particular company will pay a $2.00 dividend per share. The company expects to increase the dividend at a constant rate of 5%. Which of the following comes closest to an estimate of the value of the stock per share if you require a 12% return on the stock?

A. $28.57
B. $28.79
C. $30.00
D. $31.78

71. A particular company is expected to pay a dividend of $1.00 in exactly one year. Dividends are then expected to grow at the rate of 6% per year forever. The risk-free rate of return is 5% and the expected return on the market portfolio is 13%. Which of the following comes closest to an estimate of the value of the company per share if the company's beta is 1.2?

A. $11.62
B. $12.33
C. $13.23
D. $14.29

72. Which of the following defines the free cash flow valuation approach?

A. Cash flow in the form of dividends as a percent of revenues
B. Cash flow available to pay interest on debt
C. Cash flow available to equityholders net of capital expenditures
D. Cash flow in the form of equity retires (repurchased) by the firm

73. Which of the following comes closest to the continuously compounded rate that provides an effective annual rate of 8.5%?

A. 8.16%
B. 8.20%
C. 8.24%
D. 9.05%

74. Which of the following defines the geometric average return on a stock if the stock earned an arithmetic return of 10% each year for 10 consecutive years?

A. The geometric average return will be less than the arithmetic average return
B. The geometric average return will be equal to the arithmetic average return
C. The geometric average return will be greater than the arithmetic average return

75. Which of the following is TRUE about skewness?

A. The standard deviation of a negatively skewed distribution will overestimate risk
B. It is a measure of the degree of fat tails in a distribution
C. If the distribution is skewed to the left, extreme negative values will dominate
D. It is referred to as the fourth moment

76. Which of the following measures the dispersion of value below the expectation?

A. Value at Risk (VaR)
B. Conditional Tail Expectation (CTE)
C. Lower Partial Standard Deviation (LPSD)
D. Serial correlation

77. Suppose you invest $100 in a risky asset with an expected rate of return of 12% and a standard deviation of 15%. Suppose also that a risk-free asset exists with a rate of return of 5%. Which of the following comes closest to the percentage of your money that must be invested in the risky asset to form a portfolio with an expected return of 9%?

A. 85%
B. 75%
C. 67%
D. 57%

78. Consider a risk-free asset with a rate of return of 5% and the following risky securities:

Security A: E(r) = 0.15; Variance = 0.04
Security B: E(r) = 0.10; Variance = 0.0225
Security C: E(r) = 0.12; Variance = 0.01
Security D: E(r) = 0.13; Variance = 0.0625

From which security, formed with the T-bill and any one of the four risky securities, would a risk-averse investor always choose for his portfolio?

A. Security A
B. Security B
C. Security C
D. Security D

79. How is beta defined?

A. The covariance between the security's return and the market return divided by the variance of the market's returns
B. The covariance between the security and market returns divided by the standard deviation of the market's returns
C. The variance of the security's returns divided by the covariance between the security and market returns
D. The variance of the security's returns divided by the variance of the market's returns

80. Suppose that the risk-free rate is 7% and that the expected market rate of return is 15%. According to the capital asset pricing model, what action should you take if you expect a stock with a beta of 1.3 to offer a rate of return of 12%?

A. You should buy the stock because it is underpriced
B. You should sell the stock short because it is overpriced
C. You should do nothing because the stock is fairly priced

81. What is the main difference between the three forms of market efficiency?

A. The definition of efficiency differs
B. The definition of excess return differs
C. The definition of prices differs
D. The definition of information differs

82. When forming expectations about future stock prices, which of the following would NOT be considered by a fundamental analyst?

A. Earnings
B. Dividends
C. Trend lines
D. The company’s management team

83. What would you expect the value of the correlation coefficient between stock returns for two non-overlapping time periods to be in an efficient market?

A. Close to negative one
B. Zero
C. Close to positive one

84. Which of the following errors in information processing can occur when too much weight is given to recent experience as compared to prior beliefs?

A. Overconfidence
B. Representativeness
C. Forecasting error
D. Sample size neglect

85. On a particular day of trading there were 1,031 NYSE stocks that advanced and 610 that declined. The volume in advancing issues was 112,866,000 and the volume in declining issues was 58,188,000. What would the trin ratio signal be for this day?

A. The signal would be neutral because no pressure is indicated
B. The signal would be positive because it indicates buying pressure
C. The signal would be negative because it indicates selling pressure

86. Suppose two portfolios have the same average return and the same standard deviation of returns, but Portfolio A has a higher beta than Portfolio B. How does the performance of the two portfolios compare according to the Sharpe measure?

A. The performance of Portfolio A is greater than Portfolio B
B. The performance of Portfolio A is less than Portfolio B
C. The performance of the two portfolios is the same

87. A perfect market timer earns the risk free rate when the market is down and the market return when the market is up. The pattern of returns of a perfect market timer resembles what type of security?

A. A put option
B. A call option
C. A straddle
D. A short position in the market

88. In a Sharpe style analysis, fund returns are regressed on indexes representing a range of asset classes. What does the *R*-square of such a regression measure?

A. The percent of return variability explained by security selection
B. The percent of return variability explained by asset allocation
C. The percent of return variability explained by market timing
D. The percent of return variability explained by the benchmark return

89. In a protective put strategy, a long position in a put option is combined with what other asset?

A. A long position in the underlying asset
B. A long call option on the same underlying asset
C. A short put option on the same underlying asset
D. A short position on the underlying asset

90. You buy one Xerox June call contract (on 100 shares of stock) and one June put contract (on 100 shares of stock), both with an exercise price of $25 and both with an expiration time of two months. The call premium is $5 and the put premium is $3. What is the maximum loss on the position?

A. $200
B. $250
C. $800
D. Unlimited

91. According to the put-call parity relationship, how can the value of a European put option on a non-dividend paying stock be expressed?

A. The call value plus the present value of the exercise price plus the stock price
B. The call value plus the present value of the exercise price minus the stock price
C. The present value of the exercise price minus the stock price minus the call price
D. The present value of the exercise price plus the stock price minus the call price

92. Consider a one-year maturity call option and a one-year put option on the same stock, both with a strike price of $45. Suppose that the risk-free rate is 4%, the stock price is $48, and the put sells for $1.50. According to put-call parity, which of the following comes closest to the price of the call?

A. $ 3.23
B. $ 4.50
C. $ 6.23
D. $12.26

93. Warrants are essentially call options with what distinguishing characteristic?

A. They have an exercise price of zero
B. They offer no protection against stock splits
C. They require new shares of stock to be issued upon exercise.
D. They have no expiration date.

94. Collateralized loans can be thought of as providing what type of implicit position to the borrower?

A. A straddle
B. A call option
C. A collar

95. Which of the following describes one important distinguishing characteristic of an Asian option?

A. An expiration date that does not stay fixed over at least some portion of the life of the option
B. A payoff that is determined by the average price of the underlying asset over at least some portion of the life of the option
C. A payoff that is determined by the volatility of the underlying asset over at least some portion of the life of the option
D. The ability to turn from a call to a put, or from a put to a call, over at least some portion of the life of the option

96. Which of the following is TRUE about barrier options?

A. They have payoffs that only depend on the minimum price of the underlying asset during the life of the option
B. They have payoffs that depend both on the asset's price at expiration and on whether the underlying asset's price has crossed through some barrier
C. They have payoffs that are known in advance
D. They have payoffs that only depend on the maximum price of the underlying asset during the life of the option

97. Relative to European puts, which of the following is true of an otherwise identical American put option?

A. They are less valuable
B. They are equally valuable
C. They are more valuable

98. Assuming all else the same, a cut in the dividend payout will have what effect on the value of a call option?

A. Negative
B. Positive
C. No effect

99. The hedge ratio for a call will have what value or range of values?

A. The hedge ratio will always between negative one and zero
B. The hedge ratio will always be between zero and one
C. The hedge ratio will always be equal to one
D. The hedge ratio will always be greater than one

100. Which of the following describes a long position in a futures contract?

A. A commitment to purchase something on the delivery date
B. A commitment to sell something on the delivery date
C. An option to purchase or sell something on the delivery date
D. An option to sell something on the delivery date

Form B
CAIA Prerequisite Diagnostic Review and Answer Key

QIA = Quantitative Investment Analysis, 2nd Edition
BKM = Investments, 8th Edition

Question Number	Answer	Text Reference	Study Guide Reference
1	D	QIA, Page 12	Topic 1, Chapter 1, LO 3
2	D	QIA, Page 31	Topic 1, Chapter 1, LO 6
3	D	QIA, Page 43	Topic 1, Chapter 2, LO 1
4	A	QIA, Page 44	Topic 1, Chapter 2, LO 1
5	C	QIA, Page 62	Topic 2, Chapter 3, LO 1
6	D	QIA, Page 118	Topic 2, Chapter 3, LO 12
7	B	QIA, Page 118	Topic 2, Chapter 3, LO 12
8	A	QIA, Page 166	Topic 2, Chapter 4, LO 15
9	C	QIA, Page 138	Topic 2, Chapter 4, LO 7
10	A	QIA, Page 145	Topic 2, Chapter 4, LO 12
11	A	QIA, Page 130	Topic 2, Chapter 4, LO 1
12	D	QIA, Page 136	Topic 2, Chapter 4, LO 6
13	C	QIA, Page 147	Topic 2, Chapter 4, LO 10
14	B	QIA, Page 190	Topic 2, Chapter 5, LO 11
15	C	QIA, Page 186	Topic 2, Chapter 5, LO 8
16	B	QIA, Page 173	Topic 2, Chapter 5, LO 3
17	A	QIA, Page 197	Topic 2, Chapter 5, LO 12
18	C	QIA, Page 201	Topic 2, Chapter 5, LO 13
19	D	QIA, Page 217	Topic 2, Chapter 6, LO 2
20	D	QIA, Page 222	Topic 2, Chapter 6, LO 4
21	A	QIA, Page 227	Topic 2, Chapter 6, LO 10
22	A	QIA, Page 227	Topic 2, Chapter 6, LO 10
23	C	QIA, Page 248	Topic 2, Chapter 7, LO 2
24	D	QIA, Page 248	Topic 2, Chapter 7, LO 3
25	B	QIA, Page 261	Topic 2, Chapter 7, LO 6
26	B	QIA, Page 269	Topic 2, Chapter 7, LO 9
27	D	QIA, Page 272	Topic 2, Chapter 7, LO 9
28	B	QIA, Page 275	Topic 2, Chapter 7, LO 10
29	A	QIA, Page 287	Topic 3, Chapter 8, LO 2
30	B	QIA, Page 304	Topic 3, Chapter 8, LO 5
31	B	QIA, Page 305	Topic 3, Chapter 8, LO 5
32	A	QIA, Page 318	Topic 3, Chapter 8, LO 9
33	C	QIA, Page 305	Topic 3, Chapter 8, LO 8
34	A	QIA, Page 311	Topic 3, Chapter 8, LO 8
35	B	QIA, Page 309	Topic 3, Chapter 8, LO 6

36	A	QIA, Page 327	Topic 3, Chapter 9, LO 1
37	D	QIA, Page 327	Topic 3, Chapter 9, LO 2
38	D	QIA, Page 331	Topic 3, Chapter 9, LO 1
39	B	QIA, Page 336	Topic 3, Chapter 9, LO 3
40	A	QIA, Page 345	Topic 3, Chapter 9, LO 7
41	D	QIA, Page 353	Topic 3, Chapter 9, LO 7
42	C	QIA, Page 361	Topic 3, Chapter 9, LO 9
43	A	QIA, Page 377	Topic 3, Chapter 10, LO 1
44	A	QIA, Page 385	Topic 3, Chapter 10, LO 2
45	B	QIA, Page 386	Topic 3, Chapter 10, LO 3
46	C	QIA, Page 400	Topic 3, Chapter 10, LO 8
47	A	QIA, Page 404	Topic 3, Chapter 10, LO 9
48	B	QIA, Page 412	Topic 3, Chapter 10, LO 11
49	A	QIA, Page 438	Topic 4, Chapter 11, LO 3
50	D	QIA, Page 467	Topic 4, Chapter 11, LO 9
51	B	BKM, Page 32	Topic 5, Chapter 2, LO 2
52	B	BKM, Page 39	Topic 5, Chapter 2, LO 4
53	A	BKM, Page 55	Topic 5, Chapter 3, LO 1
54	B	BKM, Page 60	Topic 5, Chapter 3, LO 2
55	B	BKM, Page 72	Topic 5, Chapter 3, LO 3
56	A	BKM, Page 72	Topic 5, Chapter 3, LO 3
57	C	BKM, Page 76	Topic 5, Chapter 3, LO 4
58	D	BKM, Page 89	Topic 5, Chapter 4, LO 1
59	C	BKM, Page 449	Topic 6, Chapter 14, LO 3
60	A	BKM, Page 456	Topic 6, Chapter 14, LO 5
61	B	BKM, Page 468	Topic 6, Chapter 14, LO 6
62	D	BKM, Page 471	Topic 6, Chapter 14, LO 7
63	C	BKM, Page 490	Topic 6, Chapter 15, LO 2
64	A	BKM, Page 494	Topic 6, Chapter 15, LO 3
65	B	BKM, Page 516	Topic 6, Chapter 16, LO 2
66	B	BKM, Page 522	Topic 6, Chapter 16, LO 3
67	B	BKM, Page 538	Topic 6, Chapter 16, LO 5
68	C	BKM, Page 540	Topic 6, Chapter 16, LO 6
69	B	BKM, Page 592	Topic 7, Chapter 18, LO 2
70	A	BKM, Page 592	Topic 7, Chapter 18, LO 2
71	A	BKM, Page 602	Topic 7, Chapter 18, LO 2
72	C	BKM, Page 611	Topic 7, Chapter 18, LO 4
73	A	BKM, Page 119	Topic 8, Chapter 5, LO 2
74	B	BKM, Page 127	Topic 8, Chapter 5, LO 4
75	C	BKM, Page 133	Topic 8, Chapter 5, LO 6
76	C	BKM, Page 149	Topic 8, Chapter 5, LO 11
77	D	BKM, Page 166	Topic 8, Chapter 6, LO 4
78	C	BKM, Page 167	Topic 8, Chapter 6, LO 4
79	A	BKM, Page 288	Topic 8, Chapter 9, LO 2
80	B	BKM, Page 289	Topic 8, Chapter 9, LO 3

81	D	BKM, Page 348	Topic 9, Chapter 11, LO 2
82	C	BKM, Page 350	Topic 9, Chapter 11, LO 3
83	B	BKM, Page 359	Topic 9, Chapter 11, LO 7
84	C	BKM, Page 386	Topic 9, Chapter 12, LO 2
85	B	BKM, Page 400	Topic 9, Chapter 12, LO 5
86	C	BKM, Page 826	Topic 10, Chapter 24, LO 2
87	B	BKM, Page 841	Topic 10, Chapter 24, LO 4
88	B	BKM, Page 846	Topic 10, Chapter 24, LO 5
89	A	BKM, Page 682	Topic 11, Chapter 20, LO 3
90	C	BKM, Page 686	Topic 11, Chapter 20, LO 3
91	B	BKM, Page 690	Topic 11, Chapter 20, LO 4
92	C	BKM, Page 690	Topic 11, Chapter 20, LO 4
93	C	BKM, Page 696	Topic 11, Chapter 20, LO 5
94	B	BKM, Page 697	Topic 11, Chapter 20, LO 5
95	B	BKM, Page 702	Topic 11, Chapter 20, LO 5
96	B	BKM, Page 702	Topic 11, Chapter 20, LO 5
97	C	BKM, Page 721	Topic 11, Chapter 21, LO 2
98	B	BKM, Page 735	Topic 11, Chapter 21, LO 6
99	C	BKM, Page 737	Topic 11, Chapter 21, LO 7
100	A	BKM, Page 760	Topic 12, Chapter 22, LO 1