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

Form A

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

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Form A

1. A bank quotes two different interest rates on its deposits: 6.45% with an effective annual rate of 6.64%. What type of compounding does the bank use?

   A. Annual compounding
   B. Quarterly compounding
   C. Monthly compounding
   D. Continuous compounding

2. A couple sets aside €3,500 per year in an investment portfolio earning 11% each year. What comes closest to the amount the couple will have at the end of the 15^{th} year if they make their first contribution today? (16 consecutive payments)

   A. €137,164.82
   B. €122,078.28
   C. €108,651.06
   D. € 95,224.04

3. An investor is interested in how long it will take his $540,000 account to reach $1,000,000. If the account earns 4.5% compounded annually, after approximately how many years will the investor have reached his goal?

   A. 12 years
   B. 14 years
   C. 16 years
   D. 18 years

4. An investment costing a company $6 million today will pay out $1 million annually, beginning at the end of year one, for a total of 11 consecutive years. Using a 10.6% discount rate, which of the following values is closest to the net present value (NPV) of the investment?

   A. $304,466.55
   B. $309,466.55
   C. $314,466.55
   D. $319,466.55

5. In a large data set, the seventh decile for a set of monthly returns is 5.95% and the median monthly return is 4.45%. If all monthly returns are distinct, which of the following ranges must lie between 4.45% and 5.95%?

   A. The second quintile
   B. The second quartile
   C. The third quintile
   D. The third quartile

6. An economic magazine highlights its top 5 mutual funds for a particular year. The five funds that qualified had yearly turnovers of 15.2%, 14.1%, 16.3%, 19.8%, and 11.4%, respectively. Defining the population as these five funds, which of the following values is closest to the population standard deviation of turnover?

   A. 3.08
   B. 2.97
   C. 2.86
   D. 2.75

7. Which of the following conditions is TRUE about semivariance?

   A. Semivariance is always less than or equal to variance
   B. Semivariance is always greater than or equal to variance
   C. Semivariance is always equal to variance

8. Using the data table below, which of the following observations about Portfolio A and Portfolio B is MOST accurate?

	Mean Monthly Return	Variance
Portfolio A	1.4198%	5.6792%
Portfolio B	0.6619%	2.6476%

   A. Portfolio A and Portfolio B have a coefficient of variation of approximately 4
   B. Portfolio A and Portfolio B have a coefficient of variation of approximately 2
   C. Portfolio A's coefficient of variation is less than Portfolio B's

9. The probability of event A occurring is 0.45. The probability of event B occurring is 0.35. Assume the probabilities of events A and B are independent. What, approximately, is the probability of events A and B both occurring?

   A. 0.80
   B. 0.64
   C. 0.32
   D. 0.16

10. The variance of event A is 0.49 and the variance of event B is 0.36. If the covariance between the two events is 0.093, what, approximately, is the correlation between events A and B?

    A. 0.02
    B. 0.23
    C. 0.53
    D. 0.73

11. The probability of achieving a positive monthly return is 0.4 for Firm A and is 0.3 for Firm B. If the firms' probabilities are independent of one another, what is the probability that at least one firm finishes with positive return?

    A. 0.82
    B. 0.70
    C. 0.58
    D. 0.46

12. An investor made 12 trades on a particular day. Of those 12 trades, four advanced, five declined, and three were unchanged. How many combinations could have occurred?

    A. 7,920
    B. 11,880
    C. 17,280
    D. 27,720

13. Bill has a standardized score, or z-score, of 1.6 for his performance on a qualifying exam. If test scores on the qualifying exam were normally distributed, which of the following statements is the BEST interpretation of Bill's z-score?

    A. The z-score is 1.6 standard deviations above the average test score of all test-takers
    B. The z-score is 1.6 points above the average test score of all test-takers
    C. The z-score is 1.6 times the average test score of all test-takers
    D. The z-score is 1.6% better than the average test score of all test-takers

14. Which of the following conditions are properties of a set of data that is normally distributed?

    I. The mean of the data set is approximately equal to the median
    II. The kurtosis for the data set is approximately 0
    III. The skewness of the data set is approximately 0

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

15. For an upcoming 30 day cycle, consider the number of days a stock reports a positive return to be distributed binomially with a probability of 0.6. What is the expected value (EV) and the variance (VAR) around the number of days the stock will show positive returns?

    A. EV = 20, VAR = 7.5
    B. EV = 20, VAR = 7.2
    C. EV = 18, VAR = 7.5
    D. EV = 18, VAR = 7.2

16. A stock is tracked on three consecutive days. The probability of an up move for the stock on any given day is 0.7, and each day is independent of the one before it. Which of the following values comes closest to the probability the stock moves up on the first two days and down on the third?

    A. 0.441
    B. 0.343
    C. 0.245
    D. 0.147

17. The probability that a portfolio value will fall below some minimum acceptable level over a period of time is defined by which of the following terms?

    A. Value at risk
    B. Value ratio
    C. Shortfall risk
    D. Shortfall ratio

18. The value of an investment over a one-month period increases from $24.25 to $27.16. Approximately what is the equivalent continuously compounded rate of return for that one-month period?

    A. 10.98%
    B. 11.33%
    C. 11.66%
    D. 12.00%

19. Which of the following conditions is necessary to generate the standard error of the sample mean?

    A. The standard deviation of the sample is needed but the sample size is not
    B. The sample size is needed but the standard deviation of the sample is not
    C. Both the standard deviation of the sample and the sample size are needed

20. The 95% confidence interval estimate for a population mean μ when sampling from a normal distribution with a known variance of σ^2 spans from 24.1 to 24.7. What is the point estimate of the parameter μ?

    A. 24.7
    B. 24.4
    C. 0.60
    D. 0.30

21. A portfolio manager places an advertisement in a local newspaper claiming "Of the 100 variables I tested, 10 showed the ability to predict stock returns at the 90% confidence level." Assuming all of the portfolio manager's 100 variables have no actual ability to predict the stock market, what is the BEST explanation for the claim?

    A. The analysis is subject to data mining bias, as 10% of his variables would randomly appear to be significant when using a confidence level of 90%
    B. The portfolio manager was extremely lucky in the calculations and would be unlikely to be able to replicate such a high number of significant results again
    C. The analysis is subject to survivorship bias, reporting only the variables that survived his test process
    D. The analysis is subject to look-ahead bias, and the results would be invalid since the testing was focused on the results of previous time periods

22. Given the following pair of hypotheses, which of the following statements BEST describes a Type I and Type II error?

    H_o: A man is innocent
    H_a: A man is guilty

    A. Type I error: An innocent man is found guilty; Type II error: A guilty man is found innocent
    B. Type I error: A guilty man is found innocent; Type II error: An innocent man is found guilty
    C. Type I error: An innocent man is found not guilty; Type II error: A guilty man is found innocent
    D. Type I error: A guilty man is found innocent; Type II error: An innocent man is found not guilty

23. Which of the following statements correctly describes a decision to reject the null hypothesis?

    A. The null hypothesis is rejected when the p-value is equal to the significance level
    B. The null hypothesis is rejected when the p-value is less than the significance level
    C. The null hypothesis is rejected when the p-value is greater than the significance level

Use the table below to answer the following 2 questions.

The table below shows the mean and standard deviation of monthly returns for a mutual fund during two periods in the 1990's. The years do not overlap and thus the samples are independent of one another.

Year	Number of months	Mean Monthly Return (%)	Standard Deviation (%)
1990-1994	60	5.4	3.4
1995-1999	60	3.9	3.5

24. Let μ_1 equal the population mean return for the years 1990-1994, and let μ_2 equal the population mean return for the years 1995-1999. Which of the following pairs of hypotheses should be used to conduct a one-sided hypothesis test?

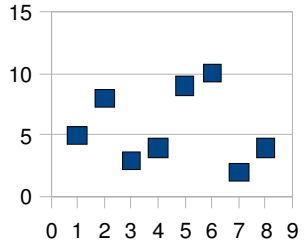
A. $H_o: \mu_1 \neq \mu_2$; $H_a: \mu_1 < \mu_2$
B. $H_o: \mu_1 = \mu_2$; $H_a: \mu_1 > \mu_2$
C. $H_o: \mu_1 - \mu_2 < 0$; $H_a: \mu_1 - \mu_2 \neq 0$
D. $H_o: \mu_1 - \mu_2 > 0$; $H_a: \mu_1 - \mu_2 = 0$

25. A *t* test statistic is calculated under the assumption of equal variances for each time period. Using the data above, which of the following values BEST approximates the *t* test statistic for a test of difference between μ_1 and μ_2?

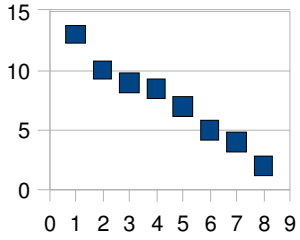
A. $t = 1.38$
B. $t = 1.88$
C. $t = 2.38$
D. $t = 2.88$

Use the two scatter plots below to answer the following question

I.



II.



26. Which of the following pairs of correlation best represents the scatter plots above?

A. Graph I: r = 0.55, Graph II: r = -0.95
B. Graph I: r = 0.55, Graph II: r = 0.95
C. Graph I: r = -0.05, Graph II: r = -0.95
D. Graph I: r = -0.05, Graph II: r = 0.95

27. The correlation coefficient between the number of taverns and the number of churches in selected American cities is 0.67. What term likely explains this relationship?

    A. Spurious correlation
    B. Serial correlation
    C. Partial correlation
    D. Regression correlation

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 following regression model:

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

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

$$\boldsymbol{b_o = 26.190 \qquad b_1 = -23.8217 \qquad r = -0.8732}$$

28. What fraction of the difference in heart disease deaths per 100,000 people can be explained by the differences in wine consumption?

    A. 23.82%
    B. 76.25%
    C. 87.32%
    D. 93.45%

Use the information in the table below to answer the next 5 questions.

Sales for a retail company are potentially related to money spent on advertising. The following provides a regression analysis in which monthly sales (in thousands of dollars) are estimated as a function of monthly advertising (in thousands of dollars).

Regression Statistics

Multiple *R*	0.825
R-squared	0.681
Standard Error	24.333
Observations	9

	Coefficients	Standard Error
Intercept	20.997	10.846
Slope	15.044	4.900

For the independent and dependent variable, the means and variances are:

	Advertising (*X*)	Sales (*Y*)
Mean	6.21	114.42
Variance	4.97	1650.07

29. Which of the following range of values represents a 95% prediction interval for the monthly sales of the company when spending 7.40 thousands of dollars on advertising?

    A. (82.94, 181.71)
    B. (78.86, 185.78)
    C. (74.79, 189.86)
    D. (70.71, 193.94)

30. The *F*-test statistic is not given. Which of the values below is the MOST likely value of the *F*-test statistic?

    A. 1.934
    B. 3.070
    C. 3.740
    D. 9.425

31. Which of the following statements regarding the regression analyses above is TRUE?

    A. The regression analyzes time-series data; the error terms do not need to be normally distributed
    B. The regression analyzes time-series data; the error terms need to be normally distributed
    C. The regression analyzes cross-sectional data; the error terms do not need to be normally distributed
    D. The regression analyzes cross-sectional data; the error terms need to be normally distributed

32. Suppose that the two data points with the largest residuals (32.934 and 30.662, respectively) are removed and the regression process is repeated with only seven points. What will the likely effect of the removal of these two points be on the values of the regression coefficients?

    A. The intercept will decrease and the slope will increase
    B. The intercept will increase and the slope will decrease
    C. Both the intercept and the slope will decrease
    D. Both the intercept and the slope will increase

33. The intercept and slope regression coefficients are tested under the null hypothesis that each is equal to zero. Using a two-tailed test for each coefficient, exactly one is found to be statistically significant at a significance level of 0.01. Which test statistic is used for each coefficient and which coefficient is significant?

    A. *t*-test statistic, intercept is significant
    B. *t*-test statistic, slope is significant
    C. *F*-test statistic, intercept is significant
    D. *F*-test statistic, slope is significant

Use the information in the table below to answer the next 4 questions.

The manager of mutual fund CSI, interested in knowing if his company behaves more like a large-cap growth fund or a large-cap value fund, estimates the following model:

$$\mathbf{Y_T = b_0 + b_1X_{1t} + b_2X_{2t} + \varepsilon_t}$$

Y_t = monthly returns to CSI
X_{1t} = monthly returns to S&P 500/BARRA Growth Index
X_{2t} = monthly returns to S&P 500/BARRA Value Index

The S&P 500/BARRA Growth and Value indexes represent predominantly large-cap growth and value stocks, respectively.

Regression Statistics

Standard Error	0.3536				
Observations	23				
ANOVA	df	SS	MSS	F	Significance F
Regression	2	2.11708	1.05854		0.00217
Residual	20	2.50091	0.12505		
Total	22	4.61799			

	Coefficients	Standard Error	*t*-statistic	*p*-value
Intercept	0.27476	0.07963	3.450	0.00253
S&P 500/BARRA Growth	0.30176	0.11692	2.581	0.01785
S&P 500/BARRA Value	0.30384	0.15472	1.964	0.06361

34. The value of the *F*-statistic is missing in the table above. Of the values below, which is the closest to the true value of the *F*-statistic?

A. 4.545
B. 8.465
C. 10.519
D. 11.903

35. Which of the following statements can be made regarding the significance of the regression coefficients? Assume a significance level of 0.05.

A. The coefficients for large-cap growth fund and large-cap value funds are both statistically significant
B. Neither of the coefficients for large-cap growth fund and large-cap value funds is statistically significant
C. The coefficient for large-cap growth fund is statistically significant but the coefficient for large-cap value fund is not
D. The coefficient for large-cap value fund is statistically significant but the coefficient for large-cap growth fund is not

36. Use the ANOVA table to calculate the value of R^2. Will the adjusted R^2 be higher or lower than your calculated value?

A. $R^2 = 0.4584$, adjusted R^2 will be larger
B. $R^2 = 0.4584$, adjusted R^2 will be smaller
C. $R^2 = 0.5416$, adjusted R^2 will be larger
D. $R^2 = 0.5416$, adjusted R^2 will be smaller

37. What is WRONG with the statement below regarding the regression coefficient estimate of b_1?

For a 1% increase in the return to the S&P 500/BARRA Growth Index, we expect a 0.30176 percentage increase in the return to CSI.

A. The qualification 'holding the return to the S&P 500/BARRA Value Index constant' is missing
B. The numbers 1.0% and 0.30176% should be switched
C. The coefficient estimate of b_1 should be 0.30384 and not 0.30176
D. There is an actual decrease in the return to CSI as opposed to an increase

38. A guiding principal of model specification is parsimony. What is meant when an analyst attempts to make the regression equation as parsimonious as possible?

A. Only variables grounded in previously proven economic reasoning are included in the final model
B. One or more regression variables needs to be transformed before estimating the final regression
C. Essential variables are included in the final model while non-essential variables are discarded
D. All essential and non-essential variables are included in the final model

39. Logit and probit models are useful in modeling which of the following types of variables?

A. Qualitative dependent variables
B. Qualitative independent variables
C. Quantitative dependent variables
D. Quantitative independent variables

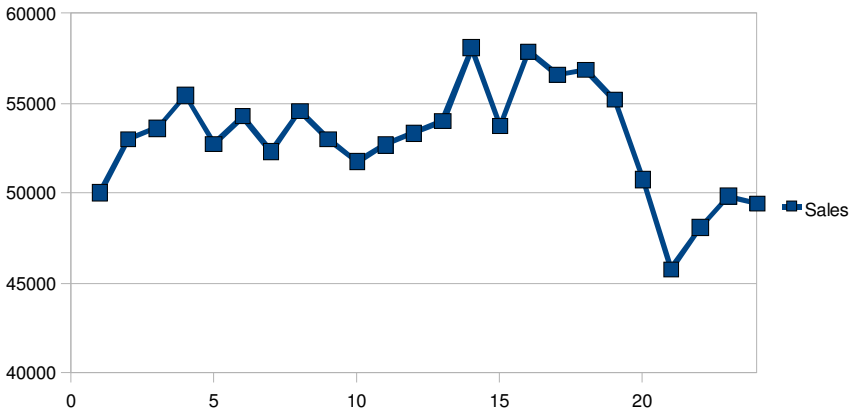
40. Which of the following specifications represents a second-order autoregression model, given by AR(2), for the variable x_t?

A. $x_t = b_0 + b_1x_{t-1} + \epsilon_t$
B. $x_t = b_0 + b_2x_{t-2} + \epsilon_t$
C. $x_t = b_1x_{t-1} + b_2x_{t-2} + \epsilon_t$
D. $x_t = b_0 + b_1x_{t-1} + b_2x_{t-2} + \epsilon_t$

41. After a first-order autoregressive model, AR(1), is fit, both the intercept and the first lag are highly significant. What other step must be taken to ensure the statistics testing the regression coefficients are valid?

A. Testing for serial correlation in the residuals using the Durbin-Watson statistic; the Durbin-Watson statistic of the error terms at all other lags should be 2
B. Testing for serial correlation in the residuals using the Durbin-Watson statistic; the Durbin-Watson statistic of the error terms at all other lags should be 0
C. Testing for serial correlation in the residuals using the *t*-statistic; the autocorrelations of the error terms at all other lags should be 2
D. Testing for serial correlation in the residuals using the *t*-statistic ; the autocorrelations of the error terms at all other lags should be 0

42. Based on the graph below, can the time series of company sales be modeled using a random walk?



A. No, because it appears that each value of the series in one period is not the value of the series in the previous period plus an random error
B. No, because it appears that each value of the series in one period is not a random value chosen within a specified range
C. Yes, because it appears that each value of the series in one period is the value of the series in the previous period plus an random error
D. Yes, because it appears that each value of the series in one period is a random value chosen within a specified range

Use the information in the table below to answer the next 3 questions.

It is determined that sales growth for a company is covariance stationary. The regression model is fit in the following way:

$$\textit{Sales growth}_t = b_0 + b_1(\text{Sales growth}_{t-1}) + b_1(\text{Sales growth}_{t-4}) + \epsilon_t$$

Regression Statistics

	Coefficient	*t*-statistic
Intercept	0.1119	4.0952
Lag 1	-0.3892	3.2817
Lag 4	0.4295	3.4102

Autocorrelations of the Residual

Lag	Autocorrelation	*t*-statistic
1	-0.2051	-1.4210
2	0.0559	0.3873
3	0.1044	0.7233
4	-0.1509	-1.0456

43. If the sales growth remained constant both last quarter and four quarters ago, what does the model predict for sales growth this quarter?

A. 4.03%
B. 7.61%
C. 11.19%
D. 14.77%

44. If sales grew by 2% last quarter and 3% four quarters ago, what does the model predict for sales growth this quarter?

A. 0.03%
B. 0.51%
C. 10.88%
D. 11.70%

45. Can we assume the model above is correctly specified?

A. No, since the residuals of this model do not have significant serial correlation
B. No, since the residuals of this model do have significant serial correlation
C. Yes, since the residuals of this model do not have significant serial correlation
D. Yes, since the residuals of this model do have significant serial correlation

Use the information in the table below to answer the next 2 questions.

	Small-Cap Stock Index	Mutual Fund Index
Expected Return	6%	4%
Standard Deviation	12%	5%
Correlation	0.8	

46. What is the expected mean return for a portfolio 30% invested in the small-cap stock index and 70% invested in the mutual fund index?

    A. 5.0%
    B. 4.8%
    C. 4.6%
    D. 4.4%

47. Which of the following percentages best approximates the standard deviation of return for a portfolio 30% invested in the small-cap index and 70% invested in the mutual fund index?

    A. 6.7%
    B. 8.8%
    C. 10.9%
    D. 13.0%

48. If the risk-free rate is 2% and the expected return on an investment is 10% with a standard deviation of 40%, what is the investor's expected risk premium per unit of risk?

    A. Expected risk premium per unit of risk = 0.08
    B. Expected risk premium per unit of risk = 0.12
    C. Expected risk premium per unit of risk = 0.16
    D. Expected risk premium per unit of risk = 0.20

Use the information in the table below to answer the next 2 questions

Portfolio	Expected Return	Factor Sensitivity
I	0.08	1.5
II	0.04	0.5
III	0.10	2.0

49. Assuming that the portfolios above are well-diversified and that a single factor explains returns, what is the risk-free rate of return?

    A. The risk-free rate of return is 1.5%
    B. The risk-free rate of return is 2.0%
    C. The risk-free rate of return is 2.5%
    D. The risk-free rate of return is 3.0%

50. Does an arbitrage exist in Portfolio III?

    A. Yes, because there is only a single factor explaining returns
    B. No, because there is only a single factor explaining returns
    C. Yes, because the return of Portfolio III meets our expectation
    D. No, because the return of Portfolio III meets our expectation

51. At which tax bracket are the after-tax returns on a corporate bond paying a coupon of 8.5% and a tax-exempt bond paying a coupon of 6.12% equivalent?

    A. 15%
    B. 28%
    C. 33%
    D. 45%

Use the information below to answer the following question.

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

52. What is the value-weighted index of these three stocks if the divisor is 100 and if stock B split 2 for 1 and stock C split 4 for 1?

    A. 490
    B. 800
    C. 880
    D. 936

53. Which of the following statements is TRUE regarding private placements of primary security offerings?

    A. They are only available to private individuals
    B. They trade mostly in secondary markets such as stock exchanges
    C. They trade with high liquidity
    D. They are shares sold directly to a small group of institutional or wealthy investors

54. Suppose you buy 100 shares of common stock at a market price of $70, and that you use margin from a broker. If the initial margin is 50% and if the maintenance margin is 30%, what stock price would generate a margin call?

    A. $21
    B. $35
    C. $50
    D. $70

55. You purchased 300 shares of common stock on margin for $60 per share. The initial margin is 60%. Which of the following percentages comes closest to your rate of return if you sell the stock at $45 per share?

    A. -25%
    B. -33%
    C. -42%
    D. -54%

56. A mutual fund reported year-end assets of $279 million and year-end liabilities of $43 million. Which of the following values comes closest to the number of shares in the fund if the fund's net asset value (NAV) was $42.13?

A. 1.18 million
B. 5.61 million
C. 6.49 million
D. 6.62 million

57. A mutual fund had a net asset value per share of $17.50 on January 1 of the current year. One year later, on December 31 of the same year, the fund's NAV was $19.50. Income distributions were $0.75 and the fund had capital gain distributions of $1.00. What amount comes closest to the rate of return on the fund?

A. 1.4%
B. 17.1%
C. 19.2%
D. 21.4%

58. Which of the following statements regarding accrued interest is TRUE?

A. Bond prices are quoted net of (without) accrued interest
B. If purchased between coupon dates, the seller must pay the buyer for accrued interest
C. Accrued interest must be paid to the broker for the inconvenience of selling bonds between maturity dates
D. The sale (or invoice price) of a bond is equal to the stated price minus the accrued interest

59. Which of the following values comes closest to the conversion premium of a convertible bond that has a par value of $1,000, a current market value of $850, a conversion ratio of 30, and whose stock trades currently at $27 per share?

A. $ 40
B. $150
C. $190
D. $200

60. Which of the following values is closest to the price of a zero-coupon annual pay bond with the following characteristics: yield to maturity = 9%, par value = $1,000, and maturity = 8 years?

A. $483.49
B. $501.87
C. $513.16
D. $526.92

61. An 8% coupon 30-year annual pay bond has a par value of $1,000 and sells for $1,150. The bond is callable in 10 years at a call price of $1,100. Which of the following percentages comes closest to the bond's yield to call?

A. 6.25%
B. 6.65%
C. 7.05%
D. 7.45%

The following is a list of prices for zero coupon bonds with different maturities and par values of $1,000. Use this table to answer the next two questions.

Maturity (Years)	Price
1	$943.40
2	$881.68
3	$808.88
4	$742.09

62. Which of the following percentages comes closest to the yield to maturity on a 3-year zero coupon bond?

A. 6.37%
B. 7.33%
C. 9.00%
D. 10.00%

63. If the 4-year spot rate is 9.95% and the 3-year spot rate is 9.80%, which of the following percentages is closest to the 1-year forward rate in year 3?

A. 9.95%
B. 10.00%
C. 10.25%
D. 10.40%

64. Which bond is more price sensitive to changes in interest rates and why?

Bond X: A par value bond with a 5-year-to-maturity and a 10% coupon rate.
Bond Y: A zero-coupon bond with a 5-year-to-maturity and a 10% yield-to-maturity.

A. Bond X because of the higher yield to maturity
B. Bond X because of the longer time to maturity
C. Bond Y because of the longer duration

65. Suppose that a callable bond with a call price of $1,050 has a current market price of $980. Suppose also that if the yield to maturity increases by 50 basis points, the bond's price will fall to $930, and if the yield to maturity decreases by 50 basis points, the bond's price will rise to $1,010. Which of the following values comes closest to the bond's effective duration?

A. 10.56
B. 9.86
C. 9.36
D. 8.16

66. Which of the following statements about contingent immunization is FALSE?

A. It is a strategy that mixes active management with passive management
B. It is a strategy that guarantees some minimum acceptable portfolio value at the horizon point
C. It is a strategy that specifies both a minimum and a maximum value of the portfolio
D. It is a strategy that allows for active management in some but not in all scenarios

67. XYZ Corporation's return on equity of 14.5% is below its payout ratio of 20%. Which of the following percentages comes closest to an estimate of XYZ's growth rate in dividends?

A. 11.6%
B. 8.1%
C. 5.5%
D. 2.9%

68. A company is expected to pay a dividend in year 1 of $1.65, a dividend in year 2 of $1.97, and a dividend in year 3 of $2.54. After year 3, dividends are expected to grow at the rate of 8% per year. Which of the following values comes closest to an estimate of the value of the company per share if its required return is 11%?

A. $33.00
B. $52.40
C. $71.80
D. $91.20

69. Which of the following statements about the P/E ratio and growth opportunities is FALSE?

A. A low P/E ratio indicates a lack of growth opportunities
B. The P/E ratio increases with ROE
C. The P/E ratio increases with lower plowback
D. A PEG ratio of 1.0 indicates that the firm's growth rate is equal to its P/E ratio

Use the following probability distribution for the holding period return for a stock to answer the following two questions.

State of the Economy	Probability	HPR
Boom	.40	22%
Normal growth	.35	11%
Recession	.25	- 9%

70. Which of the following percentages comes closest to the stock's standard deviation of returns?

A. 8.00%
B. 9.96%
C. 11.74%
D. 12.17%

71. If the Treasury bill rate is 3%, which of the following comes closest to the stock's Sharpe ratio?

A. 0.08
B. 0.35
C. 0.61
D. 0.89

72. Which of the following statistics is used to measure the degree of fat tails in a distribution?

A. Skewness
B. Kurtosis
C. Serial Correlation
D. Variance

73. Which measure of risk gives the best information about the magnitude of loss in an extremely bad scenario?

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

74. At what value of a correlation coefficient is the standard deviation of a two-asset portfolio a linear function of the assets' weights?

A. Less than zero
B. Zero
C. $\frac{\sqrt{2}}{2}$
D. One

75. Which of the following statements about alpha and the Capital Asset Pricing Model (CAPM) is TRUE?

A. A security with a positive alpha must have a positive beta
B. A security with a positive alpha has a higher expected return than the market portfolio
C. A security with a positive alpha is considered to be underpriced

76. What is the main implication of stock prices that follow a random walk?

A. Investors are irrational
B. Markets are inefficient
C. Stock price levels are random
D. Stock price changes are random

77. A new firm emerges with five extremely successful investments back-to-back in an efficient market. They are heralded by the press as brilliant market forecasters. This is an example of what type of bias?

A. Regret avoidance
B. Selection bias
C. Framing
D. The lucky event issue

78. Which of the following investigations would NOT be considered an empirical test of semistrong market efficiency?

A. An analysis of small firms versus large firms
B. An analysis of firms that are followed by many analysts versus firms with little to no attention by analysts
C. An analysis of high price to earnings firms versus low price to earnings firms
D. An analysis of firms that have hit resistance levels versus those who have not

79. Which type of information processing bias may be responsible for the prevalence of active versus passive investments management?

A. Forecasting errors
B. Overconfidence
C. Representativeness
D. Conservatism

80. Irrational preferences for high cash dividends and tendencies to hold losing positions too long are examples of what behavioral bias?

A. Mental accounting
B. Framing
C. Regret avoidance
D. Prospect theory

81. What is the preferred method of calculating the rate of return when comparing the performance of different fund managers?

A. The internal rate of return
B. The arithmetic average
C. The geometric rate of return
D. The time-weighted rate of return

Use the information in the table below to answer the next 4 questions.

	Alpha Fund	Market Portfolio
Average Return	20%	11%
Standard Deviation of Returns	44%	19%
Beta	1.8	1.0
Residual standard deviation	2.0%	0.0%

The risk-free return during the sample period was 3%.

82. Which of the following values is closest to Alpha's Sharpe measure?

A. 8.67
B. 20.45
C. 38.64
D. 45.45

83. Which of the following values is closest to Alpha Fund's Treynor measure?

A. 9.44
B. 11.11
C. 20.45
D. 38.64

84. Which of the following values comes closest to Alpha Fund's Jensen measure?

A. 2.60
B. 4.00
C. 8.67
D. 38.64

85. Which of the following values comes closest to Alpha Fund's information ratio?

A. -1.53
B. 1.30
C. 8.67
D. 31.43

86. In which of the following situations would a call option on a share of common stock be out-of-the-money?

A. The exercise price is lower than the stock price
B. The exercise price is equal to the stock price
C. The exercise price is higher than the stock price

87. What is a covered call position?

A. The simultaneous purchase of the call and the underlying asset
B. The short sale of a share of stock with a simultaneous sale of a call on that stock
C. The purchase of a share of stock with a simultaneous sale of a call on that stock
D. The simultaneous purchase of a call and sale of a put on the same stock

88. A particular stock currently sells for $48 and pays no dividend. A one-year call option with strike price of $55 sells for $9, and the risk free interest rate is 6%. According to put-call parity, which of the following values comes closest to the price of a one-year put with a strike price of $55?

A. $ 9.00
B. $12.89
C. $16.00
D. $18.72

89. When a corporation borrows money, the creditors have entered into an option on the value of the firm. What does the exercise price of this option represent?

A. The value of the assets of the firm
B. The value of the equity of the firm
C. The required payment to the creditors
D. The announced dividend payments to the shareholders

90. What type of option has a payoff that depends, in part, on the minimum or maximum price of the underlying asset over the life of the option?

A. An American option
B. A lookback option
C. An Asian option
D. A binary option

91. The price of a call option is NOT positively correlated with which of the following factors?

A. The stock price
B. The time to expiration
C. The stock volatility
D. The exercise price

92. How is delta defined?

A. A change in the value of an option for a one dollar increase in the price of the underlying asset
B. A percentage change in the value of an option for a one dollar increase in the price of the underlying asset
C. A percentage change in the value of an option for a one percent increase in the price of the underlying asset
D. A change in the volatility of the underlying stock price

93. The elasticity x of a call option will fall in what range of values?

A. $x<0$
B. $0 \leq x \leq 1$
C. $1<x$

94. How is the open interest on silver futures at a particular time defined?

A. The number of silver futures contracts traded during the day
B. The number of silver futures contracts established during the day
C. The number of all silver futures outstanding contracts

95. Which of the following relationships depicts the cost of carry relationship with futures?

A. $F_0 = S_0 (1 - r_f + d)^T$
B. $S_0 = F_0 (1 - r_f + d)^T$
C. $F_0 = S_0 (1 + r_f - d)^T$

96. Which of the following statements describes the expectations hypothesis of futures pricing?

A. The futures price is equal to the expected value of the future spot price of the asset
B. The futures price is greater than the expected value of the future spot price of the asset
C. The futures price is less than the expected value of the future spot price of the asset

97. Which of the following terms depicts a futures price that is greater than the expected future spot price?

A. Contango
B. Normal backwardation
C. Speculation
D. Collateral yield

98. Suppose that the risk-free rates in the United States and in the United Kingdom are 5% and 4%, respectively. The spot exchange rate between the dollar and the pound is $1.80/BP. What should the futures price of the pound for a one-year contract be to prevent arbitrage opportunities, ignoring transactions costs?

A. $1.62/BP
B. $1.78/BP
C. $1.80/BP
D. $1.82/BP

99. How would you exploit a stock index futures contract that is overpriced?

A. Selling both the stock index futures and the stocks in the index
B. Selling the stock index futures and buying the stocks in the index
C. Buying both the stock index futures and the stocks in the index
D. Buying the stock index futures and selling the stocks in the index

100. Which of the following statements is TRUE about credit risk in the traditional interest rate swap market?

A. It is equal to the total value of the swap's notional principal
B. It is limited to the difference between the values of the fixed rate and floating rate obligations
C. It is trivial, that is, near zero

Form A
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	C	QIA, Page 12	Topic 1, Chapter 1, LO 3
2	A	QIA, Page 14	Topic 1, Chapter 1, LO 4
3	B	QIA, Page 30	Topic 1, Chapter 1, LO 5
4	D	QIA, Page 40	Topic 1, Chapter 2, LO 1
5	C	QIA, Page 94	Topic 2, Chapter 3, LO 6
6	D	QIA, Page 103	Topic 2, Chapter 3, LO 7
7	B	QIA, Page 110	Topic 2, Chapter 3, LO 8
8	C	QIA, Page 113	Topic 2, Chapter 3, LO 10
9	D	QIA, Page 139	Topic 2, Chapter 4, LO 6
10	B	QIA, Page 157	Topic 2, Chapter 4, LO11
11	C	QIA, Page 136	Topic 2, Chapter 4, LO 6
12	D	QIA Page 167	Topic 2, Chapter 4, LO 15
13	A	QIA, Page 191	Topic 2, Chapter 5, LO 11
14	B	QIA, Page 190	Topic 2, Chapter 5, LO 9
15	D	QIA, Page 178	Topic 2, Chapter 5, LO 6
16	D	QIA, Page 185	Topic 2, Chapter 5, LO 7
17	C	QIA, Page 197	Topic 2, Chapter 5, LO 12
18	B	QIA, Page 202	Topic 2, Chapter 5, LO 14
19	C	QIA, Page 222	Topic 2, Chapter 6, LO 5
20	B	QIA, Page 227	Topic 2, Chapter 6, LO 6
21	A	QIA, Page 236	Topic 2, Chapter 6, LO 11
22	A	QIA, Page 248	Topic 2, Chapter 7, LO 2
23	B	QIA, Page 252	Topic 2, Chapter 7, LO 5
24	B	QIA, Page 261	Topic 2, Chapter 7, LO 6
25	C	QIA, Page 262	Topic 2, Chapter 7, LO 7
26	C	QIA, Page 282	Topic 3, Chapter 8, LO 1
27	A	QIA, Page 289	Topic 3, Chapter 8, LO 2
28	B	QIA, Page 309	Topic 3, Chapter 8, LO 6
29	D	QIA, Page 321	Topic 3, Chapter 8, LO 6
30	D	QIA, Page 319	Topic 3, Chapter 8, LO 9
31	B	QIA, Page 304	Topic 3, Chapter 8, LO 5
32	B	QIA, Page 287	Topic 3, Chapter 8, LO 5
33	B	QIA, Page 311	Topic 3, Chapter 8, LO 9
34	B	QIA, Page 338	Topic 3, Chapter 9, LO 5
35	C	QIA, Page 337	Topic 3, Chapter 9, LO 5
36	B	QIA, Page 340	Topic 3, Chapter 9, LO 5

37	A	QIA, Page 331	Topic 3, Chapter 9, LO 4
38	C	QIA, Page 359	Topic 3, Chapter 9, LO 9
39	A	QIA, Page 372	Topic 3, Chapter 9, LO 10
40	D	QIA, Page 386	Topic 3, Chapter 10, LO 4
41	D	QIA, Page 388	Topic 3, Chapter 10, LO 4
42	C	QIA, Page 400	Topic 3, Chapter 10, LO 8
43	C	QIA, Page 416	Topic 3, Chapter 10, LO 11
44	D	QIA, Page 416	Topic 3, Chapter 10, LO 11
45	C	QIA, Page 426	Topic 3, Chapter 10, LO 14
46	C	QIA, Page 431	Topic 4, Chapter 11, LO 1
47	A	QIA, Page 431	Topic 4, Chapter 11, LO 1
48	D	QIA, Page 449	Topic 4, Chapter 11, LO 6
49	B	QIA, Page 480	Topic 4, Chapter 11, LO 9
50	D	QIA, Page 478	Topic 4, Chapter 11, LO 12
51	B	BKM, Page 32	Topic 5, Chapter 2, LO 2
52	A	BKM, Page 42	Topic 5, Chapter 2, LO 4
53	D	BKM, Page 56	Topic 5, Chapter 3, LO 1
54	C	BKM, Page 72	Topic 5, Chapter 3, LO 3
55	C	BKM, Page 73	Topic 5, Chapter 3, LO 3
56	B	BKM, Page 89	Topic 5, Chapter 4, LO 1
57	D	BKM, Page 97	Topic 5, Chapter 4, LO 5
58	A	BKM, Page 447	Topic 6, Chapter 14, LO 2
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63	D	BKM, Page 490	Topic 6, Chapter 15, LO 2
64	C	BKM, Page 513	Topic 6, Chapter 16, LO 1
65	D	BKM, Page 526	Topic 6, Chapter 16, LO 4
66	C	BKM, Page 542	Topic 6, Chapter 16, LO 6
67	A	BKM, Page 596	Topic 7, Chapter 18, LO 2
68	C	BKM, Page 599	Topic 7, Chapter 18, LO 2
69	C	BKM, Page 604	Topic 7, Chapter 18, LO 3
70	D	BKM, Page 124	Topic 8, Chapter 5, LO 3
71	C	BKM, Page 129	Topic 8, Chapter 5, LO 5
72	B	BKM, Page 133	Topic 8, Chapter 5, LO 6
73	A	BKM, Page 148	Topic 8, Chapter 5, LO 9
74	D	BKM, Page 200	Topic 8, Chapter 7, LO 2
75	C	BKM, Page 295	Topic 8, Chapter 9, LO 3
76	D	BKM, Page 345	Topic 9, Chapter 11, LO 1
77	D	BKM, Page 357	Topic 9, Chapter 11, LO 6
78	D	BKM, Page 361	Topic 9, Chapter 11, LO 7
79	B	BKM, Page 386	Topic 9, Chapter 12, LO 2
80	A	BKM, Page 387	Topic 9, Chapter 12, LO 3
81	D	BKM, Page 824	Topic 10, Chapter 24, LO 1

82	C	BKM, Page 826	Topic 10, Chapter 24, LO 2
83	A	BKM, Page 826	Topic 10, Chapter 24, LO 2
84	A	BKM, Page 826	Topic 10, Chapter 24, LO 2
85	B	BKM, Page 826	Topic 10, Chapter 24, LO 2
86	C	BKM, Page 673	Topic 11, Chapter 20, LO 1
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88	B	BKM, Page 690	Topic 11, Chapter 20, LO 4
89	C	BKM, Page 698	Topic 11, Chapter 20, LO 5
90	B	BKM, Page 703	Topic 11, Chapter 20, LO 6
91	D	BKM, Page 716	Topic 11, Chapter 21, LO 1
92	A	BKM, Page 737	Topic 11, Chapter 21, LO 7
93	C	BKM, Page 738	Topic 11, Chapter 21, LO 7
94	C	BKM, Page 765	Topic 12, Chapter 22, LO 1
95	C	BKM, Page 774	Topic 12, Chapter 22, LO 4
96	A	BKM, Page 780	Topic 12, Chapter 22, LO 5
97	A	BKM, Page 781	Topic 12, Chapter 22, LO 5
98	D	BKM, Page 790	Topic 12, Chapter 23, LO 1
99	B	BKM, Page 798	Topic 12, Chapter 23, LO 3
100	B	BKM, Page 809	Topic 12, Chapter 23, LO 8