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CFA Level II Item-set - **Questions**
Study Session 3
June 2019

FinQuiz Item-set ID: 11437

Questions 1(*11600*) through 6(*11605*) relate to Reading 7

Elaina Watson Case Scenario

Elaina Watson, a portfolio manager at Boston Investment Management (BIM), is short-listing stocks based on the future inflation scenario in the U.S. Using inflation information for the past ten years from an economic survey, and the broad stock index performance for the same time period, Watson measured the correlation coefficient between the two data series. The resulting correlation was zero. Presenting his conclusion in a research report, Watson stated:

Statement 1:   "Since the correlation coefficient is zero, this indicates that there is no relation between the two data series. This means that the level of inflation tells us absolutely nothing about the performance of stocks in that time period."

However, when explaining the validity of the correlation coefficient as a means of determining the intensity of a relationship, Watson stated:

Statement 2:   "Correlation coefficients can be computed validly if the means and variances of the variables, as well as the covariance between them, are finite and constant."

Watson is planning to invest in YMC Enterprises, a large electronics-manufacturing firm in the U.S. As part of analyzing the firm's past performance, Watson is verifying the relationship between management compensation and the firm's profitability. She found out that the product of sales and compensation expense is highly correlated with the product of sales and net income, with the correlation as high as 0.875. Watson thus concluded that compensation expense has a significant impact on the YMC's profitability.

Watson has been hired as a consultant by Mike Costello, an engineer, to select an appropriate benchmark for his portfolio against which to measure the portfolio's performance. The portfolio manager invests mostly in value stocks. Exhibit 1 displays correlations between three indices: small cap value, large cap value, and micro cap value.

Exhibit 1

	Small-cap value index	Large-cap value index	Micro-cap value index
Small-cap value index	1.0000		
Large-cap value index	0.1378	1.0000	
Micro-cap value index	0.9865	0.9575	1.0000

BIM is holding a seminar on the use of statistical analysis in the investment decision making process. Jock Soto, a portfolio manager, will be the guest speaker. Soto has 15 years of experience working with quantitative models in an investment setting. During the lecture, Soto made the following comments while presenting an example of the relationship between interest rates and stock returns:

Statement 3: "Based on my research on stocks of ten different industries, the correlation between stock returns and interest rates is -0.642. Using an appropriate level of significance, the critical t-value is 2.7854."

Statement 4: "The mean of stock returns for stocks from ten other industries is 11.56%, whereas the mean interest rate is 7.85%. The variance of these stock returns and of interest rates is 0.000475 and 0.000693 respectively, and the covariance between them is 0.000865."

Watson has been asked to evaluate the excess return to the firm's Growth-oriented Fund. Exhibit 2 displays some calculations that Watson performed during his evaluation of the fund's alpha.

Exhibit 2

Regression Statistics	
Standard error of estimate	0.1389
Observations	85
ANOVA	**Sum of Squares**
Regression	0.2187
Residual	0.1153

1. Watson is *most* accurate with respect to:

   A. Statement 1 only.
   B. Statement 2 only.
   C. both statements 1 and 2.

2. Watson's conclusion regarding YMC Enterprises profitability is *most likely* flawed because:

   A. the use of net income is an inappropriate measure of profitability.
   B. the correlation is spurious.
   C. past performance should not be used to measure correlations.

3. An appropriate benchmark for Costello's portfolio should *most likely* constitute of:

   A. small-cap and large-cap stocks.
   B. large-cap and micro-cap stocks.
   C. small-cap, large-cap and micro-cap stocks.

4. Is the correlation coefficient between stock returns and interest rates statistically significant?

   A. Yes, because the t-statistic is –2.98.
   B. No, because the t-statistic is –2.36.
   C. No, because the t-statistic is –2.29.

5. If a linear regression is performed with stock returns as the dependent variable and interest rates as the independent variable, the intercept of the regression equation will be *closest* to:

   A. –0.027.
   B. 1.248.
   C. 0.0176.

6. Using Exhibit 2, the values for the F-statistic and the coefficient of determination are *closest* to:

    A. 157.434 and 0.655 respectively.
    B. 379.358 and 0.345 respectively.
    C. 161.227 and 0.655 respectively.

FinQuiz Item-set ID: 15544

Questions 7(*15545*) through 12(*15550*) relate to Reading 7

Titan Investment Management (TIM) Case Scenario

Titan Investment Management (TIM) is an asset management firm that provides a wide array of financial products and services to its clients. Danny Garde is the chairman of the firm with a vast experience of working with clients with diverse needs and objectives. The firm just expanded its operations to a few other states of the U.S., and for this, Garde hired a number of investment professionals including portfolio managers, financial analysts, economists and statisticians. Edward Kitsis is one of the new hires and is an expert in statistical analysis and interpretations in a financial setting. During a meeting with Garde on statistical analysis, Kitsis made the following comments:

Statement 1:   " If two variables have a correlation of positive one, all the points on their scatter plot will lie on a straight line and whenever the first variable will increase by one unit the other variable will also move by one unit, no matter what the level of the variables, and vice versa."

Statement 2:   "Correlation can be an unreliable measure when outliers are present in one or both of the series of variables being analyzed. The best way of correcting for this is to exclude the outliers in the correlation analysis so that the conclusions are not distorted."

While Garde and Kitsis were busy talking, Leesa Evans, one of the firm's portfolio managers, joined them for a discussion on significance testing of statistical parameters. Evans mentioned that she was studying the sample correlation between net income and free cash flow to the firm (FCFF) for a restaurant chain and a sports-wear manufacturer in the U.S. The correlation for the restaurant chain equaled 0.876 and the correlation for the sports-wear manufacturer equaled 0.319. However, when Evans tested these correlations for statistical significance, the correlation coefficient for the restaurant chain was not statistically significant at a 5% significance level. On the other hand, the correlation coefficient for the sports-wear manufacturer was significant at the 5% level and the null hypothesis could be rejected. Evans is not sure how this could be possible given the considerable difference in their correlations.

Kitsis's first assignment is to carry out a linear regression analysis to understand the relationship between stock market returns and the money supply growth in the country. Kitsis wants to use his conclusions to predict stock market returns in the future. Before starting with his calculations, Kitsis approached Bruce Tannis, a well-reputed financial analyst at TIM, to discuss linear regression. Tannis made the following comment:

Statement 3:   "There are a number of statistical assumptions underlying a linear
                regression model. Some of these include:

        1. The relationship between the dependent and the independent
            variables should be linear. This means that the dependent and
            independent variables should not be nonlinear, that is, raised to a
            power other than 1.
        2. The error term is normally distributed.
        3. The independent variable is not random.
        4. The variance of the error term increases with an increase in the
            number of observations."

Tannis has 30% of his portfolio invested in corporate bonds. Since he expects the
inflation rate to increase in the future, Tannis wants to analyze the relationship between
bond returns and inflation in order to predict his portfolio's performance. For this, Tannis
performed a linear regression analysis with bond returns as the dependent variable.
Exhibit 1 shows the results of the regression.

Exhibit 1

	Coefficients
Intercept	1.785
Inflation	–2.540

Tannis used the 5% level of significance for testing the significance of the regression
coefficients. Before relying on his conclusions for altering his portfolio's asset allocation,
Tannis discussed them with his colleague Peter Bergren, a portfolio manager at TIM.
Bergren performed his own analysis and found out that the standard error for the slope
coefficient, as estimated by Tannis, is twice as large as the true standard error. Bergren
stated that if this error is corrected, the confidence interval range for the coefficient will
be half as large and the t-statistic value will be twice as large as the current value.

Bergren has been hired as a consultant by Capital Advisors Inc. (CAI), to test whether
their forecasts of the percentage change in inflation are unbiased. To determine this,
Bergren estimates a regression with the actual percentage change in inflation as the
dependent variable and the predicted change as the independent variable. Exhibit 2 shows
the results of the regression. The number of observations is 72.

Exhibit 2

	Coefficients	Standard Error
Intercept	0.0239	0.4531
Prediction (**slope**)	0.9248	0.0948

Exhibit 3
T-Distribution critical values

df	p=0.10	p=0.05	p=0.025	p=0.01	p=0.005
50	1.299	1.676	2.009	2.403	2.678
60	1.296	1.671	2.000	2.390	2.660
70	1.294	1.667	1.994	2.381	2.648

Bergren is determining whether he can reject the hypothesis that the forecasts of inflation change were unbiased. He will use a 5% level of significance for his analysis, and will construct confidence intervals for each parameter.

FinQuiz Question ID: 15545

7. Kitsis is *most* accurate with respect to:

   A. Statement 1 only.
   B. both statements 1 and 2.
   C. neither Statement 1 nor Statement 2.

FinQuiz Question ID: 15546

8. Assuming that Evans calculations are accurate, what is the *most likely* reason for the difference in statistical significance of the correlation coefficients for the restaurant chain and the sports-wear manufacturer?

   A. The sample size used for analyzing the correlation between NI and FCFF for the sports-wear manufacturer is much larger than that used for the restaurant chain.
   B. The standard error of the coefficient for the sports-wear manufacturer is much larger than the standard error of the coefficient for the restaurant chain.
   C. The confidence interval for the correlation of the restaurant chain manufacturer is much tighter than the confidence interval for the correlation of the sports-wear.

FinQuiz Question ID: 15547

9. With respect to the assumptions of the linear regression model with one independent variable, Tannis is *least* accurate with respect to assumption(s):

   A. 4 only.
   B. 3 and 4 only.
   C. 1 and 4 only.

10. If instead, Tannis uses a 1% level of significance for a hypothesis test concerning the regression coefficient of inflation, which of the following would be *most* accurate?

    A. The probability of Type 1 errors will decrease, and the probability of Type 2 errors will increase.
    B. The confidence level will increase which will lead to a tighter confidence interval.
    C. The p-value for the regression coefficient will decrease.

11. Is Bergren *most likely* correct with regards to the effect of correcting the estimated standard error for the coefficient?

    A. Yes.
    B. Only with respect to the confidence interval.
    C. Only with respect to the t-statistic.

12. Using the information provided in exhibits 2 and 3, are the forecasts of inflation change *most likely* unbiased?

    A. Yes.
    B. No.
    C. The results for the model are conflicting.

FinQuiz Item-set ID: 15579

Questions 13(*15580*) through 18(*15585*) relate to Reading 7

West Newman Case Scenario

West Newman is a research firm engaged in the analysis of equity markets in the U.S. The research firm uses quantitative models to develop forecasts for a variety of market variables.

Germaine Barr and Eliza Chang are two senior analysts serving the firm. The two analysts have assembled a three member team for their next activity. This team will include the two senior analysts and a junior analyst. Their purpose is to forecast the effect of an earnings announcement, by a publically traded corporation, on its share price. They have developed the following regression equation which they plan to use for the purpose of their analysis:

$$(P_1 - P_0) = b_0 + b_1 E + e$$

$P_1 - P_0$ is the anticipated change in the corporation's per share price as a result of the earnings announcement (in US$). E is the announced earnings per share (in US$). The analysts will use the regression results to categorize analyzed corporate stocks as 'High', 'Moderate', and 'Low' based on their anticipated reaction to earnings announcements.

Barr and Chang begin their activity by listing the assumptions they plan to use in their regression.

Assumption 1: In the event a corporation's earnings are highly volatile, the regression equation may be modified by adding an exponent to the announced earnings parameter, E, used in the regression.

Assumption 2: The expected value of the error term is 1.0.

Assumption 3: In the event the error term is not normally distributed, regression analysis will be conducted using chi-square tests as opposed to F-tests of hypothesis.

Next, the team conducts the regression and obtains regression results (Exhibit 1). A 95% confidence level will be used for the analysis. The analysts have gathered the relevant portion of the *t*-distribution to be used as part of their regression analysis (Exhibit 2).

Exhibit 1
Regression Results' Statistics

Multiple R	0.9456		
R-squared	0.8942		
Standard error of estimate	0.7542		
Observations	62		
Mean return spread, $\overline{X}$	1.6344		
Variance of mean return spread	0.4248		
	Coefficients	**Standard Error**	**t-Statistic**
B_0	1.2458	0.2845	4.3791
B_1	15.1242	2.6556	5.7251

Exhibit 2
t-distribution (One-Tailed Probabilities)

Degrees of freedom (df)	$p = 0.10$	$p = 0.05$	$p = 0.025$	$p = 0.01$
1	3.078	6.314	12.706	31.821
50	1.299	1.676	2.009	2.403
60	1.296	1.671	2.000	2.390
70	1.294	1.667	1.994	2.381
80	1.292	1.664	1.990	2.374
90	1.291	1.662	1.987	2.368

In response to the regression results, the junior analyst puts forth several questions to the two senior analysts.

Question 1:   Will a relatively small correlation coefficient result in a failure to reject the null hypothesis, irrespective of sample size?

Question 2:   When using a t-statistic to test the level of significance for a parameter, will a 90% confidence level, relative to the current level of 95%, produce a type I error or a type II error?

Following the conclusion of their analysis, the team prepares a research report outlining their findings. They end the report by identifying three limitations pertaining to their regression analysis.

Limitation 1:   If we dispatch our report in the public market, there is a strong possibility that corporate stocks categorized as 'High' may not exhibit price increases to the extent forecasted, thereby increasing the standard error of estimate.

Limitation 2:   The comparability of corporate stocks across the three categories may be limited due to the fact that each category is representative of a different set of corporate characteristics.

Limitation 3:   Any violation in assumptions will automatically nullify the results
                produced by hypothesis tests as well as the regression model's predictions.

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13. The type of data used by West Newman's research team for conducting regression
    analysis is *most likely*:

    A. cross-sectional data
    B. time series data
    C. factor models

14. Which of the following regression assumptions, outlined by Barr and Chang is *most
    likely* consistent with the assumptions normally underlying the type of regression
    being conducted?

    A. 1
    B. 2
    C. 3

15. If Wilderness Inc., a corporation under study, announces an earnings per share (EPS)
    of $2.50, the 95% confidence interval for the per share price change is closest to:

    A. 37.485 to 40.627
    B. 37.514 to 40.598
    C. 37.867 to 40.245

16. Using the data in Exhibit 1 and assuming a hypothesized value of 3.50 for the slope
    coefficient, is the regression model able to produce unbiased forecasted of the per
    share price change? (Ignore the intercept).

    A. Yes, because the regression's slope coefficient falls within the confidence interval
    B. No, because the regression's slope coefficient falls outside the confidence
        interval.
    C. No, because the regression's slope coefficient falls within the confidence interval.

17. The *most* appropriate responses to the junior's two questions are:

	Question 1?	Question 2?
A.	No	Type I
B.	Yes	Type II
C.	Yes	Type I

18. Which of the following limitations identified by the team fails to correspond with the limitations generally underlying regression analysis?

A. 1
B. 2
C. 3

FinQuiz Item-set ID: 18458

Questions 19(*18459*) through 24(*18464*) relate to Reading 7

BurkingStone Enterprise Case Scenario

Adam Matthews is a senior variation analyst at BurkingStone Enterprise located in Pittsburgh, Pennsylvania. He is currently carrying out singular regression analysis on the change of money supply growth rate with the inflation rate being the independent factor. To carry out this analysis, he has requested a junior analyst to be assigned to his office. The junior analyst, Sean Russ, was briefed by Matthews on basic regression mechanisms. In the brief, Matthews made the following statements:

Statement 1: "Through linear regression, the regression model attempts to explain the independent variable."

Statement 2: "The coefficient of determination measures the fraction of the total variation in the dependant variable that is explained by the independent variable."

The data compiled for the regression between the money supply growth rate and the interest levels is displayed in Exhibit 1:

Exhibit 1

Observations	12
Confidence Level	80%
Multiple R	0.4069
Standard Error of Estimate	0.0489
Mean Growth Rate	0.0412
Variance of Mean Growth Rate	0.0846
Actual Growth Rate	0.0518
Predicted value of interest rate	0.02546

Exhibit 2 displays the t-distribution values needed for the regression analysis:

Exhibit 2

df	P=0.1	P= 0.05	P= 0.025	P= 0.01	P=0.005
8	1.397	1.860	2.306	2.869	3.499
10	1.372	1.812	2.228	2.764	3.169
12	1.356	1.762	2.179	2.681	3.055
14	1.345	1.761	2.145	2.624	2.977

FinQuiz Question ID: 18459

19. The first statement made by Matthews is *most likely*:

   A. correct.
   B. incorrect, the dependant variable in a linear regression is the variable that the regression model tries to explain.
   C. incorrect, the dependant variable is the variable that a regression model uses to explain the independent variable.

FinQuiz Question ID: 18460

20. The second statement made by Matthews is *most likely*:

   A. correct.
   B. incorrect, the coefficient of determination measures the fraction of the total variation in the independent variable that is explained by the dependant variable.
   C. incorrect, the coefficient of determination is the square of the correlations between the actual values and the predicted values of the independent variable.

FinQuiz Question ID: 18461

21. Using the data provided in Exhibit 1 and Exhibit 2, determine the critical value of the t-statistic:

   A. 1.356
   B. 1.372
   C. 1.812

FinQuiz Question ID: 18462

22. Using the data provided in Exhibit 1, calculate the coefficient of determination:

   A. 0.0085
   B. 0.1656
   C. 0.4069

23. Calculate the Squared Standard Error of the Forecast, where

$$s^2_f = s^2 \left[1 + (1/n) + \{(\text{actual} - \text{mean})^2/(n-1)s^2_x\}\right]$$

   A. 0.0024
   B. 0.0026
   C. 0.2908

24. Using the data provided in Exhibit 1 and Exhibit 2, calculate the prediction intervals.

   A. +0.0216 to 0.0293
   B. +0.0215 to 0.0294
   C. –0.0445 to 0.0954

FinQuiz Item-set ID: 18465

Questions 25(*18466*) through 30(*18471*) relate to Reading 7

Hyde Investments Case Scenario

Alana Wayne, a senior portfolio manager at Hyde Investments, is short-listing equity instruments based on future interest scenarios in the U.S. Having compiled a preliminary list of 15 stocks, she subjects these stocks to thorough regression analysis. Her secretary, Bree Costelle, has a prepared a review document for her referral in case she needs to brush up on some concepts. Following are some of the excerpts from the document:

Excerpt 1:　　A negative covariance indicates an inverse relation between the rates of return of two assets.

Excerpt 2:　　If the correlation coefficient is zero, the slope of the scatter graph is horizontal and thus, its value is zero.

Excerpt 3:　　The standard error of a correlation coefficient is used to determine the confidence intervals around a true correlation of zero.

The analysis Wayne has undertaken incorporates the relation of only one independent variable, the interest rates. Exhibit 1 displays some of the information compiled through basic correlation analysis:

Exhibit 1

Observations	45
Sum of deviations from mean of dependant variable	0.0092
Sum of deviations from estimate of dependant variable	0.0087

FinQuiz Question ID: 18466

25. The difference between the actual and predicted values of the dependant variable is known as:

   A. regression residual.
   B. sum of squared error.
   C. the standard error of estimate.

FinQuiz Question ID: 18467

26. Excerpt 1 from the review document is *most likely*:

    A. correct.
    B. incorrect, the covariance factor is insufficient to determine the direction of relation between two assets.
    C. incorrect, a negative covariance indicates a direct relation between the rates of return of two assets.

FinQuiz Question ID: 18468

27. The second excerpt from the review document is *most likely*:

    A. correct.
    B. incorrect, a correlation coefficient of zero indicates a scatter graph with an indeterminable slope.
    C. incorrect, a correlation coefficient of zero indicates a scatter graph with a vertical slope.

FinQuiz Question ID: 18469

28. The third statement from the review document is *most likely*:

    A. correct.
    B. incorrect, the standard error of a correlation coefficient is used to determine the confidence intervals around a perfect correlation of –1 or +1.
    C. incorrect, the error sum of squares is used to determine the confidence intervals around a true correlation of zero.

FinQuiz Question ID: 18470

29. The degree of variability of the actual independent value is *closest* to:

    A. 0.000076
    B. 0.000202
    C. 0.001329

FinQuiz Question ID: 18471

30. The regression sum of squares is *closest* to:

    A. 0.000009
    B. 0.000500
    C. 0.008700

FinQuiz Item-set ID: 18473

Questions 31(*18474*) through 36(*18479*) relate to Reading 7

Juan Garcia Case Scenario

Juan Garcia has recently been hired at MattNova Associates in Tampa, Florida. During his one week induction training, Garcia shadows Fred Brick, a senior portfolio manager at MAttNova Associates. During a brief on regression mechanics, Brick made the following statements:

Statement 1: "The ANOVA method is used to test whether all the regression slope coefficients are equal to zero."

Brick is currently carrying out regression analysis on a publicly listed fast food entity, the Hub. He carries out the calculation using a 90% confidence level on 20 observations taken over a ten year period. The null hypothesis is stated as $b_1 = 1.2$. Exhibit 1 displays the data compiled for the estimation of beta.

Exhibit 1

Sample Regression Slope Coefficient	0.80
Standard Error of the Slope	0.48

A table of t-distribution critical values is provided in Exhibit 2:

Exhibit 2

df	P=0.10	P=0.05	P=0.025	P=0.01	P=0.005
18	1.330	1.734	2.101	2.552	2.878
19	1.328	1.729	2.093	2.539	2.861
20	1.325	1.725	2.086	2.528	2.845
22	1.321	1.717	2.074	2.508	2.819

FinQuiz Question ID: 18474

31. Which of the following is *least likely* a source of uncertainty during regression analysis?

   A. Uncertainty in error.
   B. Uncertainty in parameters.
   C. Uncertainty in p-value.

32. While collecting samples from two or more different populations, which regression limitation is the most prominent?

   A. Parameter instability.
   B. Assumption violation.
   C. Public knowledge of the regression relationship.

33. Brick's statement regarding the ANOVA method is *most likely*:

   A. correct.
   B. incorrect, the ANOVA method is a study of variance components and does not accommodate slope coefficients in its formulae.
   C. incorrect, analysts use the ANOVA method to test a hypothesis to prove that the regressed residuals of the populations are equal.

34. Using the data provided in Exhibits 1 and 2, calculate the range outlined by the confidence interval:

   A. –0.03 to 1.63
   B. 0.16 to 1.44
   C. 0.37 to 2.03

35. What would be the *most likely* decision following the critical range defined in Question 4?

   A. Reject the null hypothesis.
   B. Fail to reject the null hypothesis.
   C. Fail to reject alternative hypothesis.

36. The t-statistic used to test the hypothesis is *closest to*:

   A. –0.833
   B. –0.500
   C. +0.833

FinQuiz Item-set ID: 18480

Questions 37(*18481*) through 42(*18486*) relate to Reading 7

KlinterHoff Associates Case Scenario

Adele Burke and Paul Johnson are model variation analysts at KlinterHoff Associates at Phoenix, Arizona. KlinterHoff Associates is a research firm engaged in the variation analysis of equity markets in the U.S. Burke and Johnson are assembling a five member team to interpret and analyze the movements of LoomVent's shares. LoomVent is a publicly listed textile giant with operations in Asia and Europe.

During interviews, Burke and Johnson asked the potential candidates multiple questions regarding correlation and regression concepts. Maria Brown, a recent CFA charterholder, made the following statements during her interview:

Statement 1:   "Failure to reject the null hypothesis is a binary decision-rule, resulting in acceptance of the alternative hypothesis."

Statement 2:   "The existence of a perfect correlation does not provide proof of causation between independent and dependant variables."

Statement 3:   "A variable scatter plot needs to be examined thoroughly to determine whether the correlation is affected by random outliers."

Statement 4:   "Assuming all other factors remain constant, a decrease in the sample size will lead to a decrease in the probability of a Type II error."

Once Burke and Johnson have assembled their team, they initiated basic quantitative analysis of the equity stock of LoomVent. They have accumulated data from 40 observations over a span of 2 years, using one independent variable for the model. Exhibit 1 provides some of the preliminary data of the stock:

Exhibit 1

Mean Square Error	0.000014
Squared deviation of dependant variable	0.004348
Squared deviation of independent variable	0.001426
Sum of squared residuals	0.000532

37. Brown's first statement regarding hypothesis decision-rules is *most likely*:

    A. correct.
    B. incorrect, failure to reject the null hypothesis will not result in the acceptance of the alternative hypothesis.
    C. incorrect, failure to reject the null hypothesis is not a binary decision-rule.

38. Brown's second statement regarding proof of causation is *most likely*:

    A. correct.
    B. incorrect, perfect correlation provides proof of causation.
    C. incorrect, any correlation between two variables provides proof of causation.

39. Brown's third statement addressing outlier adjustments is *most likely*:

    A. correct.
    B. incorrect, random outliers are to be ignored while determining correlation.
    C. incorrect, data from random outliers is to be incorporated in correlation calculations without thorough examination.

40. Brown's fourth statement is *most likely*:

    A. correct.
    B. incorrect, a decrease in the sample size will lead to an increase in the probability of a Type II error.
    C. incorrect, a decrease in the sample size will lead to an increase in the probability of a Type I error.

41. Using the data provided in Exhibit 1, calculate the coefficient of determination:

    A. 0.626928
    B. 0.672033
    C. 0.877645

42. Using the data provided in Exhibit 1, calculate the standard error of estimate:

    A. 0.0014%
    B. 0.3100%
    C. 0.3742%

FinQuiz Item-set ID: 18487

Questions 43(*18488*) through 48(*18493*) relate to Reading 7

Lake Bell Associates Case Scenario

Adrian Cooper is a recently hired portfolio manager at Lake Bell Associates located in Cleveland, Ohio. He is currently conducting a correlation analysis between the share value of Revco, a listed luxury car manufacturer, and the broad automobile index. The analysis took observations across a ten year span.

Exhibit 1 displays the summarized statistics used to run the analysis:

Exhibit 1

Multiple R	0.1540
R-squared	0.0237
Mean Squared Error	0.0064
Observations	125

Error	Coefficient	Standard
Intercept	–0.0482	0.0052
Slope Coefficient	0.5893	0.1648

During the analysis, Cooper needed to test whether the sample correlation is statistically significant or not. He calculated the critical value for the t-statistic at the 0.10 level of significance to be approximately 1.658.

While drawing out a conclusion for the report, Cooper asked his associate, Rebecca Clyde, to draw up a brief highlighting the preliminary information required for the understanding of the analysis. Clyde included the following statement in the report:

Statement 1: "Linear regression minimizes the sum of squared vertical distances between the observations and the regression line."

43. Did Cooper's regression analyze cross-sectional or time-series data, and what is the expected value of the error term from that regression?

Data Type	**EV of Error Term**
A. Time- Series	zero
B. Cross-Sectional	zero
C. Time-Series	0.0064

44. Cooper should conclude that the statistical relation between Revco and the automotive index is *most likely*:

A. significant, because the calculated test statistic has a lower absolute value than the critical value of the t-statistic.
B. significant, because the calculated test statistic has a higher absolute value than the critical value of the t-statistic.
C. insignificant, because the calculated test statistic has a higher absolute value than the critical value for the t-statistic.

45. Using the data provided in Exhibit 1, the standard error of estimate is *closest* to:

A. 0.000052
B. 0.007211
C. 0.08

46. For the analysis run by Cooper, which of the following is an *incorrect* conclusion from the regression output?

A. The estimated slope coefficient from the regression is statistically significant at the 0.10 level.
B. Viewed in combination, the slope and intercept coefficient from the regression are not statistically significant at the 0.10 level.
C. The degrees of freedom to be used to carry out the t-test are 123.

47. Which of the following is not a key assumption of the linear regression model?

A. Individual error values are normally distributed for a given value of the independent variable.
B. Independent variables and their respective residuals are correlated.
C. The variance of the error term remains constant for all observations.

48. The statement made by Clyde in the brief is *most likely*:

   A. correct.
   B. incorrect, linear regression maximizes the sum of squared vertical distances between the observations and the regression line.
   C. incorrect, linear regression minimizes the individual squared vertical distances between the observations and the regression line.

FinQuiz Item-set ID: 18494

Questions 49(*18495*) through 54(*18500*) relate to Reading 7

RapLeaf Associates Case Scenario

RapLeaf Associates is an equity research firm based in Chicago, Illinois. The annual seminars it holds in the EpiCentre Dome carry international acclamation, with financial dignitaries from around the globe attending the event. Gale Meyer, a seasoned employee at RapLeaf Associates, has held variation model workshops at the Dome for the last five years. This year, she is to brief the participants on a breakthrough regression model developed by her firm. While dictating notes for the brief to her secretary, Meyer makes the following statements:

Statement 1:   "A lower level of significance decreases the probability of a Type I error."

Statement 2:   "The p-value is the smallest level of significance at which the null hypothesis fails to be rejected."

Statement 3:   "The estimated parameters outlining a linear regression model maximize the sum of the squared regression residuals."

Meyer's colleague, Donald is currently reviewing a variation analysis carried out by a junior member of the staff. The analysis attempts to forecast the effect of relaxation therapy on depressed individuals. The case is based on 78 observations and the junior staff member has calculated the sum of square error to be 125,000.

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49. The error of regression coefficient is *most likely* the:

   A. standard error of slope.
   B. sum of squared error.
   C. standard error of estimate.

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50. A narrow confidence interval will *most likely* lead to:

   A. an increase in the probability of a Type I error.
   B. an increase in the probability of a Type II error.
   C. a decrease in the probability of a Type I error.

51. Meyer's first statement is *most likely*:

   A. correct.
   B. incorrect, a lower level of significance increases the probability of a Type I error.
   C. incorrect, a lower level of significance decreases the probability of a Type II error.

52. Meyer's second statement is *most likely*:

   A. correct.
   B. incorrect, p-value is the largest level of significance at which the null hypothesis fails to be rejected.
   C. incorrect, p-value is the smallest level of significance at which the null hypothesis can be rejected.

53. Meyer's third statement is *most likely*:

   A. correct.
   B. incorrect, the estimated parameters would minimize the sum of squared regression residuals.
   C. incorrect, the estimated parameters would maximize the correlation coefficient between two data series.

54. The mean square error for the analysis of relaxation therapy to treat distressed patients is *closest* to:

   A. 1603
   B. 1645
   C. 1666

FinQuiz Item-set ID: 18501

Questions 55(*18502*) through 60(*18507*) relate to Reading 7

WallBrooke Investments Case Scenario

Penelope Crater is a research associate at WallBrooke Investments (WBI) located in Buffalo, New York. She is currently short-listing value equity stocks based on the future inflation forecasts in the US. Having gathered inflation information for the past fifteen years from economic surveys, and the value stock index performance for the same time period, she runs the required regression based on a 20% significance level. Her null hypothesis states that there is no significant correlation between the inflation forecasts and the value index performance. Presenting her results in a research report, Crater makes the following statements:

Statement 1:   "The correlation coefficient measures the magnitude of the linear relationship between two variables."

Statement 2:   "A large sample size is necessary to reach a definite conclusion on the significance of the correlation coefficient."

Exhibit 1 displays the summarized statistical data used to run the regression:

Exhibit 1

Observations	45
Covariance factor	79.37
Variance of inflation	50
Variance of value growth index	350

Exhibit 2 displays the t-distribution values required for the analysis:

Exhibit 2

df	P=0.1	P=0.05	P=0.025	P=0.01	P=0.005
43	1.302	1.681	2.017	2.416	2.695
44	1.301	1.680	2.015	2.414	2.692
45	1.301	1.679	2.014	2.412	2.690
46	1.300	1.679	2.013	2.410	2.687

55. The first statement made by Crater is *most likely*:

   A. correct.
   B. incorrect, the correlation coefficient only measures the direction of the linear relationship between two variables.
   C. incorrect, the t-statistic, and not the correlation coefficient, measures the magnitude of the linear relationship between two variables.

56. The second statement made by Crater is *most likely*:

   A. correct.
   B. incorrect, the computation of the significance of the correlation coefficient does not require knowledge of the number of observations recorded.
   C. incorrect, a small sample size is necessary to compute an appropriate correlation coefficient.

57. Using the data provided in Exhibit 1, the sample correlation between index performance and inflation forecasts is *closest* to:

   A. 0.004
   B. 0.500
   C. 0.600

58. Using the data provided in Exhibit 1, calculate the t-statistic to test the significance of the correlation coefficient:

   A. 4.92
   B. 5.03
   C. 6.15

59. After running the initial correlation analysis, Crater would *most likely*:

   A. reject the null hypothesis, concluding that the index performance has a significant correlation with the inflation forecasts.
   B. reject the null hypothesis, concluding that the index performance has no significant correlation with the inflation forecasts.
   C. fail to reject the null hypothesis, concluding that the index performance has a significant correlation with the inflation forecasts.

FinQuiz Question ID: 18507

60. Which of the following relationships *least likely* indicates a spurious correlation?

    A. The correlation between operating cash flow and total earnings.
    B. The correlation between a managers' performance and their gender.
    C. The correlation between the performance of the S&P 500 Index and the broad equity performance index.