

CÂU HỎI LUYỆN TẬP

QUANTITATIVES METHODS CFA LEVEL 1

Question 1: Which of the following factors is not used in the calculation of a confidence interval?

- A. Point estimate
- B. Sampling error
- C. Reliability factor

Question 2: An analyst performs a simple linear regression of a stock's monthly return on the monthly return of a market index (both in %) and gathers the following information:

- Estimated slope 1.0
- Estimated intercept 1.2%
- Standard error of the forecast 1.4%
- Critical t-values at a 5% significance level 2.032

The 95% prediction interval for the stock's monthly return, given that the forecasted monthly return on the index is 3.5%, is closest to:

- A. 0.7% to 6.3%.
- B. 1.9% to 7.5%.
- C. 3.3% to 6.1%.

Question 3: An investor purchases a stock for \$100. Immediately after receiving a dividend of \$7, the investor sells the stock for \$107. The holding period return of the investment is closest to

- A. 0%
- B. 7%
- C. 14%

Question 4: For a sample of 50 observations, in which of the following situations is a nonparametric test least likely to be appropriate? The data

- A. contain outliers.
- B. are given in ranks.

C. come from a population with a lognormal distribution.

Question 5: Which of the following test statistics is most appropriate for a hypothesis test concerning the mean difference between two normally distributed populations?

- A. t-statistic
- B. F-statistic
- C. Chi-square statistic

Question 6: An asset earns 13.1% over a 16-month period. The asset's annualized compound rate of return is closest to:

- A. 9.3%.
- B. 9.7%
- C. 9.8%

Question 7: Which of the following statements is most accurate? Cryptocurrencies:

- A. exhibit low volatility
- B. have no limits on the total amount of currency that may be issued.
- C. allow transactions between parties without the need for an intermediary.

Question 8: A company estimates its revenue will be 50% higher than today in four years' time. The compound annual growth rate is closest to:

- A. 10.7%.
- B. 11.8%.
- C. 12.5%.

Question 9: Which of the following statements is most accurate with respect to the widespread adoption of algorithmic trading in financial markets?

- A. The need for low-latency networks has grown.
- B. Markets have become less fragmented in terms of trading venues.
- C. Average trade size has increased as algorithmic trading is used to execute large institutional orders

Question 10: An investor considers the following certificates of deposit (CDs) available for purchase at face value:

CD	Interest Rate
1	2.2%
2	3.3%
3	4.4%

If each CD has the same maturity and default risk, the opportunity cost of investing in CD 1 is closest to

- A. 0.0%.
- B. 1.1%.
- C. 2.26.

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1. B	2. B	3. C	4. C	5. A	6. B	7. C	8. A	9. A	10. C
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Question 1: B

A. Incorrect because a point estimate is used to calculate a confidence interval; Point estimate $\pm$ Reliability factor $\times$ Standard error = confidence interval.

B. Correct because a confidence interval for a parameter is calculated as: Point estimate $\pm$ Reliability factor $\times$ Standard error, where standard error is the standard error of the sample statistic providing the point estimate. Thus, sampling error is not part of the calculation. Sampling error is the difference between the observed value of a statistic and the quantity it is intended to estimate. It is because of sampling error that confidence intervals are used.

C. Incorrect because a reliability factor is used to calculate a confidence interval, Point estimate $\pm$ Reliability factor $\times$ Standard error = confidence interval.

Quantitative Methods: compare and contrast simple random, stratified random, cluster, convenience, and judgmental sampling and their implications for sampling error in an investment problem

Question 2: C

A. Incorrect because it uses the forecasted value of the independent variable to construct the prediction interval rather than the predicted value of the dependent variable. In other words, it assumes that the interval is given by $X_f \pm t_{critical\ for\ a/2} S_{\hat{X}_f}$; $3.5\% \times 1.4\% \approx (0.7\%, 6.3\%)$.

B. Correct because a forecasted value of the dependent variable, Y_f , is determined using the estimated intercept and slope, as well as the expected or forecasted independent variable, X_f : $Y_f = b_0 + b_1 X_f$ where b_0 and b_1 are the estimated intercept and slope coefficients, respectively. Hence, $Y_f = 1.2\% + 1.0 \times 3.5\% = 4.7\%$. Next, the prediction interval is $Y_f \pm t_{critical\ for\ a/2} S_{\hat{Y}_f}$ where $S_{\hat{Y}_f}$ denotes the standard error of the forecast. Hence, the prediction interval is given by: $4.7\% \pm 1.4\% \times 2.032 \approx (1.9\%, 7.5\%)$.

C. Incorrect because it neglects the critical t - values when constructing the prediction interval. In other words, it assumes that the interval is given by $Y_f \pm s_f$; $4.7\% \pm 1.4\%$ (3.3%, 6.1%).

Quantitative Methods: calculate and interpret the predicted value for the dependent variable, and a prediction interval for it, given an estimated linear regression model and a value for the independent variable

Question 3: C

A. Incorrect because it incorrectly subtracts the dividend instead of adding it, and thus calculates $HPR = (\$107 - \$100 - \$7)/\$100 = \$0/\$100 = 0\%$. The same result is obtained if the holding period return is calculated as $R = (\$100 - \$107 + \$7)/\$107 = \$0/\$107 = 0\%$.

B. Incorrect because it omits the dividend and calculates $R = (\$107 - \$100)/\$100 = \$7/\$100 = 7\%$. It is also the ratio of the dividend received over the initial investment, $\$7/\$100 = 7\%$.

C. Correct because a holding period return is the return earned from holding an asset for a single specified period of time. This return can be generalized and shown as a mathematical expression in which P is the price and I is the income: $R = (P_1 - P_0 + D_1)/P_0$ Thus, $R = (\$107 - \$100 + \$7)/\$100 = \$14/\$100 = 14\%$.

Quantitative Methods: calculate and interpret major return measures and describe their appropriate uses

Question 4: A

A. Incorrect because we primarily use nonparametric procedures in four situations: (1) when the data we use do not meet distributional assumptions, (2) when there are outliers, (3) when the data are given in ranks or use an ordinal scale, or (4) when the hypotheses we are addressing do not concern a parameter. This is one of the situations (situation 2) in which a nonparametric test would be appropriate.

B. Incorrect because we primarily use nonparametric procedures in four situations: (1) when the data we use do not meet distributional assumptions, (2) when there are outliers, (3) when the data are given in ranks or use an ordinal scale, or (4) when the hypotheses we are addressing do not concern a parameter. This is one of the situations (situation 3) in which a nonparametric test would be appropriate.

C. Correct because a nonparametric test would be less appropriate compared to other answers as in this case a parametric test can be used. We may want to test a hypothesis concerning the mean of a population but believe that neither t - nor z - distributed tests are appropriate because the sample is small and may come from a markedly non - normally distributed population. In that case, we may use a nonparametric test. In our case, the data sample is large, thus a parametric test can be used instead

Quantitative Methods: compare and contrast parametric and nonparametric tests, and describe situations where each is the more appropriate type of test

Question 5: A

A. Correct because for a Test of Mean Differences (Normally Distributed Populations, Unknown Population Variances)... when we have data consisting of paired observations from samples generated by normally distributed populations with unknown variances, a t - test is based on $t = (d - \mu_d)/s_d$ with n - 1 degrees of freedom, where n is the number of paired observations, d is the sample mean difference.... and s_d is the standard error of d

B. Incorrect because for a Test of Mean Differences (Normally Distributed Populations, Unknown Population Variances)... when we have data consisting of paired observations from samples generated by normally distributed populations with unknown variances, a t - test is based on $t = (d - \mu_d)/s_d$ with n - 1 degrees of freedom, where n is the number of paired

observations, d is the sample mean difference..., and s , is the standard error of d . An F - test can be appropriate for Tests Concerning Differences between the Variances of Two Populations.

C. Incorrect because for a Test of Mean Differences (Normally Distributed Populations, Unknown Population Variances)... when we have data consisting of paired observations from samples generated by normally distributed populations with unknown variances, a t - test is based on $t = (d - H_0)/s$, with $n - 1$ degrees of freedom, where n is the number of paired observations, d is the sample mean difference.... and s , is the standard error of d . In tests concerning the variance of a single normally distributed population [not the mean difference between two populations], we make use of a chi - square test statistic.

Quantitative Methods: construct hypothesis tests and determine their statistical significance, the associated Type I and Type II errors, and power of the test given a significance level

Question 6: B

A. Incorrect because it is the compound rate of return per month times 12; $[(1 + 0.13100)^{(1/16)} - 1] \times 12 = 0.0077236 \times 12 = 0.09268 \sim 9.3\%$. This is also the geometric mean return per month times 12.

B. Correct because a general equation to annualize returns is given, where c is the number of periods in a year. For a quarter, $c = 4$ and for a month, $c = 12$: $r_{\text{annual}} = (1 + r_{\text{period}})^c - 1$. That is, for 16 months, $c = 12/16 = 0.75$ and the annualized return is $(1 + 0.13100)^{0.75} - 1 = 1.09672 - 1 = 0.09672 \approx 9.7\%$.

C. Incorrect because it is the arithmetic mean return per month times 12; $(0.13100/16) \times 12 = 0.0081875 \times 12 = 0.09825 \sim 9.8\%$.

Quantitative Methods: calculate and interpret major return measures and describe their appropriate uses

Question 7: C

A. Incorrect because it is important to note that many cryptocurrencies have experienced high levels of price volatility. A lack of clear fundamentals underlying these currencies has contributed to their volatility.

B. Incorrect because many cryptocurrencies have a self - imposed limit on the total amount of currency they may issue.

C. Correct because a cryptocurrency, also known as a digital currency, operates as electronic currency and allows near - real - time transactions between parties without the need for an intermediary, such as a bank.

Alternative Investments: describe financial applications of distributed ledger technology

Question 8: A

A. **Correct** because a growth rate (g) is calculated as $g = (FV_N/PV)^{1/N} - 1$, where FV is the future value, PV is the present value and N is the number of periods. Here, $g = (1.5/1)^{1/4} - 1 = 0.10668 \approx 10.7\%$.

B. Incorrect because it is calculated as $\ln(1 + 0.5/4) - 1 = \ln(1.125) - 1 = 0.11778 \sim 11.8\%$.

C. Incorrect because it is calculated as: $50\%/4 = 12.5\%$.

Quantitative Methods: calculate and interpret annualized return measures and continuously compounded returns, and describe their appropriate uses

Question 9: A

A. **Correct** because algorithmic trading requires access to low - latency networks, and with the wide - spread adoption of algorithmic trading, the need for low - latency networks has grown. Low - latency systems - systems that operate on networks that communicate high volumes of data with minimal delay (latency) - are essential for automated trading applications that make decisions based on real - time prices and market events. In contrast, high - latency systems do not require access to real - time data and calculations. High - frequency trading is a form of algorithmic trading that makes use of vast quantities of granular financial data (tick data, for example) to automatically place trades when certain conditions are met. Trades are executed on ultra - high - speed, low - latency networks in fractions of a second.

B. Incorrect because global financial markets have undergone substantial change as markets have fragmented into multiple trading destinations consisting of electronic exchanges, alternative trading systems, and so - called dark pools, and average trade sizes have fallen.

C. Incorrect because, although algorithmic trading is increasingly used to execute large institutional orders, it is slicing orders into smaller pieces and executing across different exchanges and trading venues. Global financial markets have undergone substantial change as markets have fragmented into multiple trading destinations consisting of electronic exchanges, alternative trading systems, and so - called dark pools, and average trade sizes have fallen.

Quantitative Methods: describe applications of Big Data and Data Science to investment management

Question 10: C

A. Incorrect because the investor is foregoing higher rates of return by investing in the security with the lowest return.

B. Incorrect because 1.1% is not the most the investor is foregoing; however, it is the difference if incorrectly using the average return of the three securities.

C. **Correct** because all three securities have the same maturity and default risk so the investor is foregoing 2.2% ($4.4\% - 2.2\%$) by investing in CD 1 rather than investing in CD 3.



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Quantitative Methods: interpret interest rates as required rates of return, discount rates, or opportunity costs and explain an interest rate as the sum of a real risk - free rate and premiums that compensate investors for bearing distinct types of risk