

## Quantitative Methods – Topic Test 2

1. Kramer is retiring next year. He wants \$30,000 annually each year after the retirement for his living expenses. He will be getting a pension of \$10,000 per annum from his employer. His current investment and savings portfolio is worth \$400,000. How much return should his portfolio generate so that he can keep the nominal value of the portfolio and can maintain the current lifestyle? Assume that there are no inflation and taxes.
  - a) 5.00 percent
  - b) 7.50 percent
  - c) 10.00 percent
  
2. Abdul had invested some money in a fixed income security many years ago. The investment has become 5 times of its initial value. Abdul expects it to become 6 times of its initial value in two more years. What is the effective annual rate of return on the investment?
  - a) 9.54 percent
  - b) 10.00 percent
  - c) 41.42 percent
  
3. Kane is planning to invest money in a real estate. The real estate is currently selling at \$20,000. The real estate is expected to provide a return of 20% for next five year with the development of a highway near to the property. Kane wants a required rate of return of 22%. How much money he should pay for the real estate investment?
  - a) \$18,413.53
  - b) \$19,600.00
  - c) \$21,723.16
  
4. You have invested in an equity security of a company. You bought the security for \$20 per share. The security is expected to be included in a major index because of which its liquidity will increase. The liquidity premium is expected to decrease by 1 percent. The inflation is expected to increase by 2 percent and the real risk-free rate is also expected to decrease by 2 percent. What will the impact on the security price because of the above factors?
  - a) Decrease
  - b) Increase
  - c) No impact

5. A security has a stated annual interest of 6 percent which is compounded semi-annually. What should be the stated annual interest rate for another security that has the same effective annual rate as that of the first security but the interest is compounded continuously?
  - a) 6.28 percent
  - b) 6.09 percent
  - c) 5.91 percent
  
6. A security is providing annual coupon of \$15 till perpetuity. The discount rate of the security is 10 percent. It is expected to provide the next coupon in 3 months. What should be the value of the security?
  - a) \$164.65
  - b) \$161.11
  - c) \$146.47
  
7. You bought a car for \$50,000 by putting \$20,000 in the down payment and the rest of the amount is amortized fully using equal monthly installments at the end of each period. The annual discount rate is 12 percent compounded monthly. You decide to repay all the loan amount on your second installment date. How much money do you need to pay to repay the complete loan amount assuming that there is no penalty for early repayment?
  - a) \$12,507.59
  - b) \$12,555.54
  - c) \$12,601.39
  
8. There is an investment scheme that provides you \$1 million after 10 years if you invest \$200,000 in the beginning of the first year and \$20,000 as an annuity amount each year at the end of every year for 10 years. What is the effective annual rate provided by the investment scheme?
  - a) 11.82 percent
  - b) 12.38 percent
  - c) 23.17 percent

9. A project has the following cash flows:

End of year	0	1	2	3	4	5
Cash flow	-\$40,000	\$28,000	\$22,000	-\$33,000	\$16,000	\$25,000

- What is the NPV of the project at a discount rate of 10.5 percent?
- a) -\$3,736.23
  - b) \$4,805.42
  - c) \$53,722.12
10. What will be the most likely impact on the doubling of all the cash flows of the project on the IRR and NPV of the project?
- a) IRR will increase by less than 2 times, NPV will increase by 2 times
  - b) No change in IRR, NPV will increase by 2 times
  - c) Both IRR and NPV will increase by 2 times
11. What will be the impact on the IRR of the project if the cost of capital increases by 2 percent and every cash flow of the project increases by 5 percent?
- a) Increase in IRR
  - b) Decrease in IRR
  - c) No change in IRR
12. Travis calculated the NPV of a conventional project to be EUR 5,235. On rechecking his calculations, he found out that he had mistakenly replaced the cash flow of 3rd and 4th year with each other. The actual cash flows at the end of year 3 and 4 are EUR 27,000 and EUR 32,000 respectively. What will be the net change in the NPV of the project after correcting the mistake? The discount rate for the project is 12 percent.
- a) Decrease by EUR 381.31
  - b) Decrease by EUR 762.62
  - c) Increase by EUR 381.31
13. A treasury bill is trading at \$980 with a face value of \$1,000. The treasury bill has 270 days to maturity. What is the money market yield for the treasury bill?
- a) 2.02 percent
  - b) 2.72 percent
  - c) 2.76 percent

14. The money market yield for a treasury bill is 4.50 percent. What is the holding period yield for the bond for a holding period of 90 days?
- a) 1.0913 percent
  - b) 1.1065 percent
  - c) 1.1250 percent
15. Which of the following returns measures is most likely to be a preferred performance measure in the investment industry for a mutual fund? Assume that the fund manager has no control on the addition of cash flows and withdrawal of cash flows from the investors.
- a) Money weighted return
  - b) Time weighted return
  - c) Value weighted return
16. You invest in a share that pays a dividend of \$2 at the end of each year. You buy 300 shares for \$120 per share at the beginning of the first year. He sells 100 shares for \$130 per share at the end of the first year and the rest of the shares for \$115 per share at the end of the second year. What is the money-weighted return for the investment?
- a) -0.83 percent
  - b) 1.69 percent
  - c) 3.56 percent
17. An analyst wants to calculate the average salary earned by finance professionals. He takes a random sample of 500 guys and calculates the average salary and the variance in the salary. Then he submits the results of his experiment with his manager. What kind of statistics has been performed by the analyst?
- a) Descriptive statistics
  - b) Inferential statistics
  - c) Experimental statistics
18. The following is the table showing the annual returns of a mutual fund for last 8 years:

12.40%	-9.25%	5.48%	3.21%	14.08%	26.83%	4.27%	11.12%
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What is the target semi variance for the mutual fund below a target return of 10.00%?

- a) 0.015664
- b) 0.011748
- c) 0.006713

19. The inter-quartile range for the returns of a mutual fund is 2.50 percent to 9.45 percent. Which of the following is most likely to be the 80th percentile of the returns?
- a) -1.87 percent
  - b) 8.98 percent
  - c) 9.82 percent
20. The arithmetic mean and geometric mean for last 5 year returns for an investment are equal and both are equal 8 percent. What is the standard deviation of the returns for last five years?
- a) 8.94 percent
  - b) 8.00 percent
  - c) 0.00 percent
21. For the data measured on which of the following scales, we can apply the widest range of statistical tools?
- a) Ordinal scale
  - b) Ratio scale
  - c) Interval scale
22. Which of the following statements is correct for a normal distribution?
- a) Range is less than twice of the inter-quartile range
  - b) Range is twice of the inter-quartile range
  - c) Range is more than twice of the inter-quartile range
23. Which of the following statements is most likely to be accurate for a return distribution with no skewness and fatter tails?
- a) The mean is larger than the median
  - b) The mean is smaller than the median
  - c) The mean is equal to the median
24. Which of the following statements is least likely to be accurate regarding the skewness of a distribution?
- a) A positively skewed distribution has frequent small losses and a few extreme gains
  - b) A negatively skewed distribution has frequent small losses and a few extreme gains
  - c) Investors are attracted by a positive skew because the mean return falls above the median

25. The skewness of a distribution of annual returns of a mutual fund is measured as  $-0.24$ . The mean of the returns distribution is 12 percent. Which of the following is the most likely value of the median of the distribution?
- a) 13.50 percent
  - b) 12.00 percent
  - c) 11.76 percent
26. What is the most likely value of excess kurtosis for a platykurtic return distribution for a large sample?
- a)  $-0.15$
  - b) 2.45
  - c) 3.65
27. You put a bet of \$100 on an event X at odds of 5 to 1 against X. After some time you are able to put a bet of \$400 against X at odds of 1 to 1 in favor of X. What will be the net profit made by you on the occurrence of X?
- a) Zero
  - b) \$100
  - c) \$200
28. The earnings per share of MotoCorp Inc. is dependent on the outcome of presidential elections. If the republican party comes into the power, then the EPS will be \$6 with a probability of 60 percent and \$4 with a probability of 40 percent. If democrats come into the power, then the EPS will be \$5 with a probability of 70 percent and \$3 with a probability of 30 percent. The probability of republican winning the elections is 45 percent and the probability of democrats winning the elections is 55 percent. What is the expected value of the earnings per share of MotoCorp Inc.?
- a) \$4.76
  - b) \$4.84
  - c) \$5.20

29. The probability that a company's income will grow by 20 percent annually for next 3 years under the current CEO is 45 percent. The shareholders are contemplating about the replacement of the current CEO with a new CEO. John and Matthew have been shortlisted for the post of the CEO. The conditional probability of 20 percent annual growth in the income for next 3 years depending on the selection of John as CEO is 55 percent. The conditional probability of 20 percent annual growth in the income for next 3 years depending on the selection of Matthews is 40 percent. The chances of selection of John is 30 percent and the selection of Matthews is 20 percent. What is the probability that the company's income will grow by 20 percent annually for next 3 years?
- a) 0.455  
b) 0.470  
c) 0.695
30. There is a 70 percent probability of an increase in the price of a share of a bank if bank index also increases in price on a given day. Also, there is 80 percent probability that the share of the bank will fall if there is a decrease in the price of the bank index. The probability of a decrease in the price of the bank index is 40 percent. Assume that there are only two events possible: Increase in price or decrease in price. What is the joint probability of a decrease in the price of stock and an increase in the price of the bank index?
- a) 0.18  
b) 0.26  
c) 0.42
31. The joint probabilities of the returns for two stocks are given in the table below:

Joint probability		Returns of stock B		
		0.18	0.10	0.02
Returns of stock A	0.12	0.30	0	0
	0.08	0	0.50	0
	-0.03	0	0	0.20

What is the expected return on the portfolio of these two stocks if 40 percent is invested in stock A and 60 percent is invested in the stock B?

- a) 8.52 percent  
b) 9.28 percent  
c) 9.76 percent

32. What is the correlation between stock A and stock B for the data provided in the previous question if the variances of stock A and stock B are 0.0028 and 0.003136 respectively?
- a) 0.84
  - b) 0.86
  - c) 0.94
33. The share price of a stock follows a binomial distribution. The stock is expected to either go up by 25 percent with a probability of 0.55 or come down by 20 percent with a probability of 0.45 in a year. What is the expected price of the stock at the end of two years if the current share price is \$100?
- a) \$109.50
  - b) \$109.73
  - c) \$110.12
34. The returns distribution of a stock is following a continuous uniform distribution with a range of returns from -12 percent to 16 percent. What is the Sharpe ratio of the stock if the risk-free rate is 1 percent?
- a) 0.12
  - b) 0.49
  - c) 1.53
35. You have invested money in a mutual fund that is following a benchmark index. During the year, the benchmark index had a return of 12.00 percent. The total return earned by the mutual fund net of fees was 10.50 percent. The total fees charged by the mutual fund is 0.75 percent. What is the tracking error of the mutual fund?
- a) -0.75 percent
  - b) -1.50 percent
  - c) -2.25 percent
36. The daily variance of returns of a stock is 0.00024. What is the annual variance of the stock assuming 250 trading days in a year?
- a) 0.003795
  - b) 0.060000
  - c) 0.244949



37. Which of the following models is least likely to provide the insights into the cause-and-effect relationships?
- a) Monte Carlo Simulation model
  - b) Black-Scholes-Merton model
  - c) Binomial model
38. The Roy's safety first ratio for a stock is 1.00 with a threshold return of 6 percent. What is the approximate probability that the return of the stock will be lower than the threshold return?
- a) 0.16
  - b) 0.34
  - c) 0.84
39. The continuously compounded returns from a stock are normally distributed. The stock price is most likely to follow what kind of distribution?
- a) Continuous uniform distribution
  - b) Normal distribution
  - c) Lognormal distribution
40. The returns of a stock follow a normal distribution. The 95 percent confidence interval for the stock is -11.6 percent to 27.6 percent. What is the 99 percent confidence interval for the stock?
- a) -15.3 percent to 31.3 percent
  - b) -17.8 percent to 33.8 percent
  - c) -15.8 percent to 35.8 percent
41. The CFA Institute wants to know about the feedback about the CFA level I exam from the candidates. They select one candidate after every 100 registered candidates and send them the questionnaire regarding the feedback for the exam. What kind of sampling has been used by the CFA Institute?
- a) Simple random sampling
  - b) Systematic sampling
  - c) Stratified sampling

42. Which of the following statements is the most accurate about the distribution of the sample mean for the underlying data whose distribution is normal?
- a) The sampling distribution of the sample mean is normal for any sample size
  - b) The sampling distribution of the sample mean is normal only for sample size  $\geq 25$
  - c) The sampling distribution of the sample mean is normal only for sample size  $\geq 30$
43. Bill is taking samples from a data of the quarterly returns from a mutual fund over last 30 years. The distribution of the population returns is normal. The variance of returns for the population is 0.0064. Bill takes samples of size 25. What will be the standard error of the distribution of the sample mean?
- a) 0.0256%
  - b) 0.1280%
  - c) 1.6000%
44. The 95% confidence interval for the returns for a hedge fund for a year is -12% to 40% using z-values as the population is normally distributed. What is the standard error for the distribution of the sample mean from the returns of that hedge fund for a sample size of 36?
- a) 13.26%
  - b) 2.33%
  - c) 2.21%
45. Which of the following statements is most accurate about the difference between t-distribution and normal distribution for a given level of significance?
- a) The confidence interval based on t-values will be narrower than those based on the normal distribution
  - b) The confidence interval based on t-values will be of the same width as those based on the normal distribution
  - c) The confidence interval based on t-values will be wider than those based on the normal distribution

46. Which of the following statements is most likely to be correct for the statistical results based on the short time series and long time series?
- a) The short time series will have less relevance but more statistical accuracy as compared to the long time series
  - b) The short time series will have more relevance but less statistical accuracy as compared to the long time series
  - c) The short time series will have less relevance and less statistical accuracy as compared to the long time series
47. Adam Grant used a divisor of  $n$  for calculation the sample variance for a data. Which of the following desirable properties of an estimator is most likely to be violated by him?
- a) Unbiasedness
  - b) Efficiency
  - c) Consistency
48. You are trying to identify whether there is any correlation between the alpha (excess risk-adjusted return) and the management fee charged by the mutual funds. Formulate null and alternate hypotheses consistent with the verbal description of you research goal.
- a) Null hypothesis:  $\rho = 1$ ; Alternate hypothesis:  $\rho \neq 1$
  - b) Null hypothesis:  $\rho \geq 0$ ; Alternate hypothesis:  $\rho < 0$
  - c) Null hypothesis:  $\rho = 0$ ; Alternate hypothesis:  $\rho \neq 0$
49. A group of doctors is conducting a research on the harmful side effect of a drug. The drug contains lead. If the levels of lead are higher than a 0.05 percent then it can have harmful effects after consumption. The group wants to be really strict about the validity of the result because the consequences can be life threatening. Which of the following significance levels would test the hypothesis in the strictest sense?
- a) 10 percent
  - b) 5 percent
  - c) 1 percent

50. You are checking the hypothesis with an alternate hypothesis that the variance of Indian equity market is less than the variance of Chinese equity market. You have calculated the F-test statistic using the higher of the variance in the numerator and lower in the denominator as per the convention. What will your rejection point for the null hypothesis for 5 percent degree of significance?
- a) Reject if the test statistic is greater than the upper 5 percent of the F-distribution with the specified number of numerator and denominator degrees of freedom
  - b) Reject if the test statistic is lesser than the lower 5 percent of the F-distribution with the specified number of numerator and denominator degrees of freedom
  - c) Reject if the test statistic is lesser than the lower 2.5 percent of the F-distribution with the specified number of numerator and denominator degrees of freedom
51. What is the number of degrees of freedom for a hypothesis test for a paired comparison test concerning the mean differences of two normally distributed populations for the sample size of 27?
- a) 25
  - b) 26
  - c) 27
52. You are testing a hypothesis to test whether the difference between the returns of S&P 500 and Treasury 10 years bonds is greater than 3 percent or not. The returns from S&P 500 and Treasury 10 years bonds are normally distributed with unequal and unknown variances. The mean returns and variances of the sample are given in the table below:

	Sample mean	Sample variance	Sample size
S&P 500	0.10	0.0583	20
Treasury 10 years bond	0.08	0.0096	32

What is the calculated test statistic for the hypothesis test?

- a) 0.352
- b) -0.176
- c) -0.761

53. The 95 percent confidence interval for the mean of annual returns of FTSE is 6.24 percent to 12.64 percent. What will be the result of the hypothesis to check whether the return of FTSE is greater than or equal to 13.00 percent at 5 percent level of significance?
- a) Fail to reject the null hypothesis
  - b) Reject the null hypothesis
  - c) Cannot be told from the data given
54. For which of the following p-values, we fail to reject the null hypothesis assuming the significance level of 5 percent?
- a) 0.0341
  - b) 0.0500
  - c) 0.0622
55. You are checking whether the alpha of mutual funds is correlated with the risk taken by the fund manager. The following table presents the sample.

Mutual Fund	1	2	3	4
Alpha (X)	0.03	0.02	-0.04	0.00
Standard deviation (Y)	23.38%	27.85%	24.59%	33.46%

What is the value of Spearman rank correlation coefficient for the above data?

- a) 0.30
  - b) -0.30
  - c) -0.40
56. Which of the following statements is least accurate about the point and figure chart?
- a) The volume is represented in the point and figure chart
  - b) The horizontal axis reflects the passage of time
  - c) The horizontal axis represents the number of change in price, not time

57. Which of the following head and shoulders patterns is most attractive from the reversal standpoint?

	Volume of trading quantity		
	First shoulder	Head	Second shoulder
Head and Shoulders 1	35,000	30,000	25,000
Head and Shoulders 2	35,000	50,000	35,000
Head and Shoulders 3	35,000	30,000	35,000

- a) Head and Shoulders 1  
 b) Head and Shoulders 2  
 c) Head and Shoulders 3
58. When should a trader initiate a position in a head and shoulders pattern?
- a) When the stock price is just starting to go down after touching the topmost point of the head  
 b) When the stock price is just starting to go down after touching the topmost point of the second shoulder  
 c) When the stock price has breached the neckline after the formation of the second shoulder
59. The historical put/call ratio for a stock is 0.8. During a particular period, the put/call ratio is 0.2. What is a most likely indication a trader can take from this ratio?
- a) Stock price is going to fall  
 b) Stock price is going to rise  
 c) No clear indication as both the historical ratio and the ratio of the period are less than 1.0
60. Which of the following statements is least accurate about the different cycles?
- a) In a decennial pattern, years ending with a 0 have had the worst performance, and years ending with a 5 have been by far the best  
 b) In a presidential cycle, the midterm years have the worst performance and the election year has the best performance  
 c) Three 18-year cycles make up the Kondratieff wave