

CFA L1 Quan Homework

1. Use the following probability distribution to calculate the standard deviation for the portfolio.

State of the Economy	Probability	Return on Portfolio
Boom	0.30	15%
Bust	0.70	3%

A) 6.0%. B) 5.5%. C) 6.5%. D) 7.0%.

2. Each lottery ticket discloses the odds of winning. These odds are based on:

- A) a priori probability.
- B) past lottery history.
- C) the best estimate of the Department of Gaming.
- D) marketing principles.

3. Assume an investor makes the following investments:

- Today, she purchases a share of stock in Redwood Alternatives for \$50.00.
- After one year, she purchases an additional share for \$75.00.
- After one more year, she sells both shares for \$100.00 each.

There are no transaction costs or taxes. The investor's required return is 35.0%.

During year one, the stock paid a \$5.00 per share dividend. In year two, the stock paid a \$7.50 per share dividend.

The time-weighted return is: A) 51.7%. B) 23.2%. C) 14.7%. D) 51.4%.

4. A stock portfolio's returns are normally distributed. It has had an average annual return of 25 percent. The 90 percent confidence interval for the returns is -1 to 91 percent. What is the 99 percent confidence interval?

- A) -66 to 116%.
- B) -58.4 to 98.4%.
- C) -78.2 to 128.2%.
- D) -20 to 20%.

5. A securities analyst is performing a hypothesis test on the average earnings per share for a sample of large-cap companies. The sample size is large and the population variance is known. The development of a 95 percent confidence interval around the average EPS value requires all of the following **EXCEPT** a:

- A) sample average EPS.
- B) population standard deviation divided by the square root of the sample size.
- C) Critical one-sided *t*-value with .05 in the right tail.
- D) Z-score of 1.96.

6. Construct a 90% confidence interval for the starting salaries of 100 recently hired employees with average starting salaries of \$50,000 and a standard deviation of \$3,000 assuming the population has a normal distribution.

- A) 50,000 +/- 1.65(3,000).
- B) 50,000 +/- 1.65(300).
- C) 30,000 +/- 1.65(5,000).
- D) 50,000 +/- 1.65(30,000).

7. An analyst managed a portfolio for many years and then liquidated it. Computing the internal rate of return of the inflows and outflows of a portfolio would give the:

- A) time-weighted return.
- B) ratio of (1 + time-weighted return) / (1 + risk-free rate).
- C) money-weighted return.
- D) net present value.

8. Use a stated rate of 9% compounded periodically to answer the following three questions. Select the choice that is the closest to the correct answer.

Part 1) The semi-annual effective rate is: A) 9.20%. B) 9.00%. C) 10.25%. D) 9.31%.

Use a stated rate of 9% compounded periodically to answer the following three questions. Select the choice that is the closest to the correct answer.

Part 2)

The quarterly effective rate is:

- A) 9.00%.
- B) 9.20%.
- C) 9.31%.
- D) 9.40%.

Use a stated rate of 9% compounded periodically to answer the following three questions. Select the choice that is the closest to the correct answer.

Part 3)

The continuously compounded rate is:

- A) 9.20%. B) 9.42%. C) 9.45%. D) 9.67%.

9. Which of the following statements regarding the money-weighted and time-weighted rates of return is *least* accurate?

- The time-weighted rate of return reflects the compound
- A) rate of growth of one unit of currency over a stated measurement period.
 - B) The money-weighted rate of return removes the effects of the timing of additions and withdrawals to a portfolio.
 - C) The time-weighted rate of return is the standard in the investment management industry.
 - D) The money-weighted rate of return is the internal rate of return on a portfolio, taking into account all cash flows.

10. In order to calculate the net present value (NPV) of a project, an analyst would *least likely* need to know the:

- A) opportunity cost of capital for the project.
- B) expected cash flows from the project.
- C) timing of the expected cash flows from the project.
- D) internal rate of return (IRR) of the project.

11. Portfolio A earned a return of 10.23% and had a standard deviation of returns of 6.22%. If the return over the same period on Treasury bills (T-bills) was 0.52% and the return to Treasury bonds (T-bonds) was 4.56%, what is the Sharpe ratio of the portfolio?

- A) 0.56.
- B) 0.91.
- C) 7.71.
- D) 1.56.

12. A local bank offers an account that pays 8%, compounded quarterly, for any deposits of \$10,000 or more that are left in the account for a period of 5 years. The effective annual rate of interest on this account is:

- A) 8.24%.
- B) 9.01%.
- C) 4.65%.

13. Which of the following indicates the frequency of an interval in a frequency distribution histogram?

- A) Horizontal logarithmic scale.
- B) Width of the corresponding bar.

- C) Height multiplied by the width of the corresponding bar.
- D) Height of the corresponding bar.

14. Sarah Parker is buying a new \$25,000 car. Her trade-in is worth \$5,000 so she needs to borrow \$20,000. The loan will be paid in 48 monthly installments and the annual interest rate on the loan is 7.5%. If the first payment is due at the end of the first month, what is Sarah's monthly car payment?

- A) \$480.57.
- B) \$416.67.
- C) \$483.58.
- D) \$427.63.

15. What is the compound annual growth rate for stock A which has annual returns of 5.60%, 22.67%, and -5.23%?

- A) 6.00%.
- B) 7.08%.
- C) 8.72%.
- D) 17.44%.

16. Let A and B be two mutually exclusive events with $P(A) = 0.40$ and $P(B) = 0.20$. Therefore:

- A) $P(B|A) = 0.20$.
- B) $P(A \text{ or } B) = 0.52$.
- C) $P(A \text{ and } B) = 0.08$.
- D) $P(A \text{ and } B) = 0$.

17. Marc Schmitz borrows \$20,000 to be paid back in four equal annual payments at an interest rate of 8%. The interest amount in the second year's payment would be:

- A) \$1116.90.
- B) \$1600.00.
- C) \$6038.40.
- D) \$1244.90.

18. In 10 years, what is the value of \$100 invested today at an interest rate of 8% per year, compounded monthly?

- A) \$180.
- B) \$216.
- C) \$222.
- D) \$219.

19. Each lottery ticket discloses the odds of winning. These odds are based on:

- A) a priori probability.
- B) past lottery history.
- C) the best estimate of the Department of Gaming.
- D) marketing principles.

20. If \$2,500 were put into an account at the end of each of the next 10 years earning 15% annual interest, how much would be in the account at the end of ten years?

- A) \$50,759.
- B) \$27,461.
- C) \$41,965.
- D) \$79,431.

21. Use the results from the following survey of 500 firms to answer the question.

Number of Employees	Frequency
300 up to 400	40
400 up to 500	62
500 up to 600	78
600 up to 700	101
700 up to 800	131
800 up to 900	88

The frequency of the third class is:

- A) 156.
- B) 78.
- C) 180.
- D) 500.

22. When Annette Famigletti hears that a baseball-loving friend is coming to visit, she purchases two premium-seating tickets for \$45 per ticket for an evening game. As the date of the game approaches, Famigletti's friend telephones and says that his trip has been cancelled. Fortunately for Famigletti, the tickets she holds are in high demand as there is chance that the leading Major League Baseball hitter will break the home run record during the game. Seeing an opportunity to earn a high return, Famigletti puts the tickets up for sale on an internet site. The auction closes at \$150 per ticket. After paying a 10% commission to the site (on the

amount of the sale) and paying \$8 total in shipping costs, Famigletti's holding period return is approximately:

- A) 191%.
- B) 202%.
- C) 91%.
- D) 182%.

23. The following data points are observed returns.?

4.2%, 6.8%, 7.0%, 10.9%, 11.6%, 14.4%, 17.0%, 19.0%, 22.5%, 28.1%

What return lies at the seventh decile (70% of returns lie below this return)?

- A) 18.4%.
- B) 17.0%.
- C) 19.0%.
- D) 16.8%.

24. The financial manager at IBFM, a farm implement distributor, is contemplating the following three mutually exclusive projects. IBFM's required rate of return is 9.5%. Based on the information provided, which should the financial manager select and why?

Project	Investment at $t = 0$	Cash Flow at $t = 1$	IRR	NPV @ 9.5 percent
A	\$10,000	\$11,300	13.00	\$320
B	\$25,000	\$29,000	16.00	\$1,484
C	\$35,000	\$40,250	15.00	\$1,758

- A) Project A with the lowest initial investment.
- B) Project B with the highest internal rate of return.
- C) Project C with the highest net present value.
- D) All of the projects, because they all earn more than 9.5%.

25. It will cost \$20,000 a year for four years when an 8-year old child is ready for college. How much should be invested today if the child will make the first of four annual withdrawals 10-years from today? The expected rate of return is 8%.

- A) \$33,138.
- B) \$30,683.
- C) \$66,243.
- D) \$80,000.

26. A parking lot has 100 red and blue cars in it.

- 40% of the cars are red.
- 70% of the red cars have radios.
- 80% of the blue cars have radios.

Part 1) What is the probability of selecting a car at random and having it be red and have a radio?

- A) 25%.
- B) 40%.
- C) 28%.
- D) 48%.

Part 2) What is the probability of selecting a car at random that is either red or has a radio?

- A) 28%.
- B) 76%.
- C) 116%.
- D) 88%.

Part 3)

What is the probability that the car is red given that you already know that it has a radio?

- A) 28%.
- B) 37%.
- C) 47%.
- D) 88%.

27. An investor is considering investing in Tawari Company for one year. He expects to receive \$2 in dividends over the year and feels he can sell the stock for \$30 at the end of the year. To realize a return on the investment over the year of 14%, the price the investor would pay for the stock today is *closest to*:

- A) \$28.
- B) \$29.

- C) \$30.
- D) \$32.

28. Financial managers should always select the project that provides the highest net present value (NPV) whenever NPV and IRR methods conflict, because maximizing:

- A) revenues is the goal of financial management.
- B) earnings per share is the goal of financial management.
- C) the shareholders' rate of return is the goal of financial management.
- D) shareholder wealth is the goal of financial management.

29. A local loan shark offers 4 for 5 on payday. What it involves is that you borrow \$4 from him and repay \$5 on the next payday (one week later). What would the stated annual interest rate be on this loan, with weekly compounding? What is the effective annual interest rate on this loan? Assume 52 weeks in one year, and select the answer closest to your numbers.

<u>Stated Interest Rate</u>	<u>Effective Interest Rate</u>
A) 25%	300%
B) 25%	1,300%
C) 260%	1,312%
D) 1,300%	10,947,544%

30. An investor invested \$10,000 into an account five years ago. Today, the account value is \$18,682. What is the investor's annual rate of return on a continuously compounded basis?

- A) 12.50%.
- B) 13.31%.
- C) 11.33%.
- D) 21.01%.

From Session 2, Reading 5, LOS c, (Part 2)

31. How much would the following income stream be worth assuming a 12% discount rate?

- \$100 received today
- \$200 received 1 year from today
- \$400 received 2 years from today
- \$300 received 3 years from today

- A) \$810.98.
- B) \$1,112.44.
- C) \$721.32.
- D) \$865.34.

E	7
F	8
G	12

32. A joint probability of A and B must always be:

- A) less than or equal to the conditional probability of A given B.
- B) greater than or equal to the conditional probability of A given B.
- C) greater than or equal to than the probability of A or B.
- D) less than the probability of A and the probability of B.

33. In any given year, the chance of a good year is 40%, an average year is 35%, and the chance of a bad year is 25%. What is the probability of having two good years in a row?

- A) 16.00%.
- B) 10.00%.
- C) 8.75%.
- D) 6.25%.

34. Given the following table about employees of a company based on whether they are smokers or nonsmokers and whether or not they suffer from any allergies, what is the probability of both suffering from allergies and not suffering from allergies?

	Suffer from Allergies	Don't Suffer from Allergies	Total
Smoker	35	25	60
Nonsmoker	55	185	240
Total	90	210	300

- A) 0.50.
- B) 0.00.
- C) 1.00.
- D) 0.24.

35. For the investments shown in the table below, what are the mean, median, and mode of the returns?

Investment	Return (%)
A	12
B	14
C	9
D	13

	Mean	Median	Mode
A)	12.00%	12%	12%
B)	11.20%	12%	12%
C)	10.71%	9%	13%
D)	10.71%	12%	12%

36. In a positively skewed distribution, what is the order (from lowest value to highest) for the distribution [] mode, mean, and median values?

- A) Mode, mean, median.
- B) Mean, median, mode.
- C) Median, mean, mode.
- D) Mode, median, mean.

37. What is the yield on a discount basis for a Treasury bill priced at \$97,965 with a face value of \$100,000 that has 172 days to maturity?

- A) 3.95%.
- B) 4.07%.
- C) 2.04%.
- D) 4.26%.

38. A very large company has twice as many male employees relative to female employees. If a random sample of four employees is selected, what is the probability that all four employees selected are female?

- A) 0.0123.
- B) 0.0625.
- C) 0.3333.
- D) 0.6667.

39. Use the following data to calculate the standard deviation of the return:

- 50% chance of a 12% return
- 30% chance of a 10% return
- 20% chance of a 15% return

- A) 2.5%.
- B) 1.7%.
- C) 3.0%.

D) 3.3%.

40. Thomas Baynes has applied to both Harvard and Yale. Baynes has determined that the probability of getting into Harvard is 25% and the probability of getting into Yale (his father's alma mater) is 42%. Baynes has also determined that the probability of being accepted at both schools is 2.8%. What is the probability of Baynes being accepted at either Harvard or Yale, but not both?

- A) 7.7%.
- B) 10.5%.
- C) 64.2%.
- D) 67.0%.

41. A distribution that has positive excess kurtosis:

- A) is less peaked than a normal distribution.
- B) has thinner tails than a normal distribution.
- C) is more peaked than a normal distribution.
- D) is more skewed than a normal distribution.

42. Assume that the following returns are a sample of annual returns for firms in the clothing industry. Given the following sample of returns, what are the sample variance and standard deviation?

Firm 1	Firm 2	Firm 3	Firm 4	Firm 5
15%	2%	5%	(7%)	0%

Variance

Standard Deviation

- | | |
|---------|-----|
| A) 32.4 | 5.7 |
| B) 64.5 | 8.0 |
| C) 22.0 | 4.7 |
| D) 51.6 | 7.2 |

43. What is the effective annual yield of a T-bill that has a money market yield of 5.665% and 255 days to maturity?

- A) 4.01%.
- B) 5.79%.
- C) 5.92%.
- D) 5.67%.

44. The probability of A is 0.4. The probability of A^c is 0.6. The probability of $(B|A)$ is 0.5, and the probability of $(B|A^c)$ is 0.2. Using Bayes' formula, what is the probability of $(A|B)$?

- A) 0.625.
- B) 0.875.
- C) 0.125.
- D) 0.375.

45. If two fair coins are flipped and two fair six-sided dice are rolled, all at the same time, what is the probability of ending up with two heads (on the coins) and two sixes (on the dice)?

- A) 0.4167.
- B) 0.0039.
- C) 0.8333.
- D) 0.0069.

46. The correlation coefficient for a series of returns on two investments is equal to 0.80. Their covariance of returns is 0.06974. Which of the following are possible variances for the returns on the two investments?

- A) 0.02 and 0.44.
- B) 0.04 and 0.19.
- C) 0.03 and 0.28.
- D) 0.08 and 0.37.

47. Compute the present value of a perpetuity with \$100 payments beginning four years from now. Assume the appropriate annual interest rate is 10%.

- A) \$683.
- B) \$909.
- C) \$751.
- D) \$1000.

48. The probability of each of three independent events is shown in the table below. What is the probability of A and C occurring, but not B?

Event	Probability of Occurrence
A	25%
B	15%
C	42%

- A) 8.9%.

- B) 3.8%.
- C) 4.2%.
- D) 10.5%.

700 up to 800	131
800 up to 900	88

The number of classes in this frequency table is:

49. A sample of returns for four randomly selected assets in a portfolio is shown below:

Asset	Return (%)
A	1.3
B	1.4
C	2.2
D	3.4

What is the sample standard deviation of asset returns?

- A) 0.97%.
- B) 0.88%.
- C) 1.13%.
- D) 1.97%.

50. An investor has the choice of two investments. Investment A offers interest at 7.25% compounded quarterly. Investment B offers interest at the annual rate of 7.40%. Which investment offers the *higher* dollar return on an investment of \$50,000 for two years, and by how much?

- A) Investment B offers a \$36.92 greater return.
- B) Investment A offers a \$53.18 greater return.
- C) Investment A offers a \$122.18 greater return.
- D) Investment B offers a \$19.11 greater return.

51. What's the effective rate of return on an investment that generates a return of 12%, compounded quarterly?

- A) 14.34%.
- B) 12.00%.
- C) 12.55%.
- D) 13.33%.

52. Use the results from the following survey of 500 firms to answer the question.

Number of Employees	Frequency
300 up to 400	40
400 up to 500	62
500 up to 600	78
600 up to 700	101

- A) 5.
- B) 100.
- C) 600.
- D) 6.

53. A company says that whether it increases its dividends depends on whether its earnings increase. From this we know:

- A) $P(\text{both dividend increase and earnings increase}) = P(\text{dividend increase})$.
- B) $P(\text{dividend increase or earnings increase}) = P(\text{both dividend and earnings increase})$.
- C) $P(\text{earnings increase} | \text{dividend increase})$ is not equal to $P(\text{earnings increase})$.
- D) $P(\text{dividend increase} | \text{earnings increase})$ is not equal to $P(\text{earnings increase})$.

54. Use the following probability distribution to calculate the standard deviation for the portfolio.

State of the Economy	Probability	Return on Portfolio
Boom	0.30	15%
Bust	0.70	3%

- A) 5.5%.
- B) 6.0%.
- C) 6.5%.
- D) 7.0%.

55. A conditional expectation involves:

- A) determining the expected joint probability.
- B) calculating the conditional variance.
- C) refining a forecast because of the occurrence of some other event.
- D) estimating the skewness.

56. Which of the following statements concerning a distribution with positive skewness and positive excess kurtosis is *least* accurate?

- A) The mean will be greater than the mode.
 - B) There are a large number of positive outliers.
 - C) It has a lower percentage of small deviations from the mean than a normal distribution.
 - D) It has fatter tails than a normal distribution.
57. If \$2,000 a year is invested at the end of each of the next 45 years in a retirement account yielding 8.5%, how much will an investor have at retirement 45 years from today?
- A) \$100,135.
 - B) \$277,700.
 - C) \$90,106.
 - D) \$901,060.

TFRA

1. Answer was B) 5.5%. $[0.30 \times (0.15 - 0.066)^2 + 0.70 \times (0.03 - 0.066)^2]^{1/2} = 5.5\%$. From Session 2, Reading 8, LOS k

2. Answer was A) An a priori probability is based on formal reasoning rather than on historical results or subjective opinion. This question tested from Session 2, Reading 8, LOS b

3. Answer was D) 51.4%. To calculate the *time-weighted* return: *Step 1: Separate the time periods into holding periods and calculate the return over that period: Holding period 1:* $P_0 = \$50.00$; $D_1 = \$5.00$; $P_1 = \$75.00$ (from information on second stock purchase) $HPR_1 = (75 - 50 + 5) / 50 = 0.60$, or 60% \rightarrow *Holding period 2:* $P_1 = \$75.00 \rightarrow D_2 = \$7.50 \rightarrow P_2 = \$100.00$ $HPR_2 = (100 - 75 + 7.50) / 75 = 0.433$, or 43.3%. *Step 2: Use the geometric mean to calculate the return over both periods* $\text{Return} = [(1 + HPR_1) \times (1 + HPR_2)]^{1/2} - 1 = [(1.60) \times (1.433)]^{1/2} - 1 = 0.5142$, or **51.4%**. From Session 2, Reading 6, LOS c, (Part 2)

4. Answer was C) -78.2 to 128.2%. A 90 percent confidence level includes the range between plus and minus 1.65 standard deviations from the mean. Dividing the size of this range by 1.65 gives the size of one standard deviation: $(91 - 25) / 1.65 = 40$. A 99 percent confidence level includes the range between plus and minus 2.58 standard deviations from the mean. Multiplying the standard deviation of 40 by 2.58 and then adding and subtracting the result from the mean produces the 99 percent confidence interval: $(25 - (2.58 * 40)) = -78.20$ is the lower end of the range, and $(25 + (2.58 * 40)) = 128.20$ is the higher end of the range. This question tested from Session 3, Reading 9, LOS g

5. Answer was C) Critical one-sided *t*-value with .05 in the right tail. Since the sample size is large and the population variance is known, we use the two-tailed Z-score of 1.96 (2.5% in each tail) and the standard error computed using population standard deviation. The confidence interval is $\text{Sample Average EPS} \pm 1.96(\text{Standard Error})$. This question tested from Session 3, Reading 9, LOS g

6. Answer was A) 90% confidence interval is $X - 1.65s = 50,000 \pm 1.65(3,000) = \$45,050$ to $\$54,950$. This question tested from Session 3, Reading 9, LOS g

7. Answer was C) money-weighted return. The money-weighted return is the internal rate of return on a portfolio that equates the present value of inflows and outflows over a period of time. From Session 2, Reading 6, LOS c, (Part 1)

8. Part 1) Answer was A) First, we need to calculate the periodic rate, or $0.09 / 2 = 0.045$. Then, the effective semi-annual rate = $(1 + 0.045)^2 - 1 = 0.09203$, or 9.20%. From Session 2, Reading 5, LOS c, (Part 1)

Part 2) Answer was C) 9.31%.

First, we need to calculate the periodic rate, or $0.09 / 4 = 0.0225$. Then, the effective annual rate = $(1 + 0.0225)^4 - 1 = 0.09308$, or 9.31%. From Session 2, Reading 5, LOS c, (Part 1)

Part 3) Answer was B) 9.42%. The continuously compounded rate = $e^r - 1 = e^{0.09} - 1 = 0.09417$, or 9.42%. *Calculator Keystrokes for e^x :* Using the TI BA, enter [0.09] [2nd] [e^x] (this is the key with LN on the face of the button). On the HP, enter [0.09] [g] [e^x] (this key is located in blue on the key with 1/x in white print). From Session 2, Reading 5, LOS c, (Part 1)

9. Answer was B) The money-weighted rate of return removes the effects of the timing of additions and withdrawals to a portfolio. The money-weighted return is actually highly sensitive to the timing and amount of withdrawals and additions to a portfolio. The time-weighted return removes the effects of timing and amount of withdrawals to a portfolio and reflects the compound rate of growth of \$1 over a stated measurement period. Because the time-weighted rate of return removes the effects of timing, it is the standard in the investment management industry. From Session 2, Reading 6, LOS c, (Part 1)

10. Answer was D) internal rate of return (IRR) of the project. The NPV is calculated using the opportunity cost, discount rate, expected cash flows, and timing of the expected cash flows from the project. The project \square IRR is not used to calculate the NPV. From Session 2, Reading 6, LOS a, (Part 1)

11. Answer was D) 1.56.

Sharpe ratio = $(R_p - R_f) / \sigma_p$, where $(R_p - R_f)$ is the difference between the portfolio return and the risk free rate, and σ_p is the standard deviation of portfolio returns. Thus, the Sharpe ratio is: $(10.23 - 0.52) / 6.22 = 1.56$. Note, the T-bill rate is used for the risk free rate. From Session 2, Reading 7, LOS h, (Part 2)

12. Answer was A) $(1 + \text{periodic rate})^m - 1 = (1.02)^4 - 1 = 8.24\%$. From Session 2, Reading 5, LOS c, (Part 1)

13. Answer was D) Height of the corresponding bar. In a histogram, intervals are placed on horizontal axis, and frequencies are placed on the vertical axis. The frequency of the particular interval is given by the value on the vertical axis, or the height of the corresponding bar. From Session 2, Reading 7, LOS c, (Part 2)

14. Answer was C) \$483.58.

$N = 48$; $I/Y = 7.5 / 12 = 0.625$; $PV = 20,000$; $FV = 0$; $CPT \rightarrow PMT = 483.58$. From Session 2, Reading 5, LOS e

15. Answer was B) 7.08%. Compound annual growth rate is the geometric mean. $(1.056 \times 1.2267 \times 0.9477)^{1/3} - 1 = 7.08\%$
From Session 2, Reading 7, LOS d

16. Answer was D) $P(A \text{ and } B) = 0$. If the two events are mutually exclusive, the probability of both occurring is zero.

From Session 2, Reading 8, LOS d

17. Answer was D) \$1244.90.

With $PV = 20,000$, $N = 4$, $I/Y = 8$, computed $Pmt = 6,038.42$.
Interest (Yr1) = $20,000(0.08) = 1600$. Interest (Yr2) = $(20,000 - (6038.42 - 1600))(0.08) = 1244.93$ From Session 2, Reading 5, LOS e

18. Answer was C) \$222. $N = 10 \times 12 = 120$; $I/Y = 8/12 = 0.666667$; $PV = ?00$; $PMT = 0$; $CPT \rightarrow FV = 221.96$. From Session 2, Reading 5, LOS c, (Part 2)

19. Answer was A) An a priori probability is based on formal reasoning rather than on historical results or subjective opinion. From Session 2, Reading 8, LOS b

20. Answer was A) $N = 10$; $I = 15$; $PMT = 2,500$; $CPT \rightarrow FV = \$50,759$. From Session 2, Reading 5, LOS d, (Part 2)

21. Answer was B) 78. The third class is 500 - 600 with a frequency of 78. From Session 2, Reading 7, LOS b

22. Answer was A) The holding period return is calculated as: $(\text{ending price} - \text{beginning price} \pm \text{any cash flows}) / \text{beginning price}$. Here, the beginning and ending prices are given. The other cash flows consist of the commission of \$30

$(0.10 \times 150 \times 2 \text{ tickets})$ and the shipping cost of \$8 (total for both tickets). Thus, her holding period return is: $(2 \times 150 - 2 \times 45 - 30 - 8) / (2 \times 45) = 1.91$, or approximately **191%**.

From Session 2, Reading 6, LOS b

23. Answer was A) The formula for the seventh decile is $L_y = (n + 1)(7 / 10) = 7.70$ or between the seventh and eighth return from the left. The seventh return is 17%, while the eighth return is 19%. Interpolating, we find that the seventh decile is $17\% + 0.7(19\% - 17\%) = 18.4\%$. From Session 2, Reading 7, LOS e

24. Answer was C) Project C with the highest net present value. When projects are mutually exclusive, only one can be chosen. Project selection should be done on the basis of which project will enhance firm value the most. That project, Project C in this case, is the one with the highest NPV. From Session 2, Reading 6, LOS a, (Part 2)

25. Answer was A) Two steps. First, find the present value of the college costs as of the end of year 9. (Remember that the PV of an ordinary annuity is as of time = 0. If the first payment is in year 10, then the present value of the annuity is indexed to the end of year 9). $N = 4$; $I/Y = 8$; $PMT = 20,000$; $CPT \rightarrow PV = \$66,242.54$. Second, find the present value of this single sum: $N = 9$; $I/Y = 8$; $FV = 66,242.54$; $PMT = 0$; $CPT \rightarrow PV = 33,137.76$. From Session 2, Reading 5, LOS e

26. Part 1) Answer was C) 28%.

Joint probability is the probability that both events, in this case a car being red *and* having a radio, happen at the same time. Joint probability is computed by multiplying the individual event probabilities together: $P(\text{red and radio}) = (P(\text{red})) \times (P(\text{radio})) = (0.4) \times (0.7) = 0.28$ or 28%.

	Radio	No Radio	
Red	28	12	40
Blue	48	12	60
	76	24	100

From Session 2, Reading 8, LOS e, (Part 1)

Part 2) Answer was D) 88%. The addition rule for probabilities is used to determine the probability of at least one event among two or more events occurring, in this case a car being red *or* having a radio. To use the addition rule, the probabilities of each individual event are added together, and,

if the events are not mutually exclusive, the joint probability of both events occurring at the same time is subtracted out:

$$P(\text{red or radio}) = P(\text{red}) + P(\text{radio}) - P(\text{red and radio}) = 0.40 + 0.76 - 0.28 = 0.88 \text{ or } 88\%$$

From Session 2, Reading 8, LOS e, (Part 1)

Part 3) Answer was B) 37%. Given a set of prior probabilities for an event of interest, Bayes's formula is used to update the probability of the event, in this case that the car we already know has a radio is red. Bayes's formula says to divide the Probability of New Information given Event by the Unconditional Probability of New Information and multiply that result by the Prior Probability of the Event. In this case, $P(\text{red car has a radio}) = 0.70$ is divided by 0.76 (which is the Unconditional Probability of a car having a radio (40% are red of which 70% have radios) plus (60% are blue of which 80% have radios) or $((0.40) \times (0.70)) + ((0.60) \times (0.80)) = 0.76$.) This result is then multiplied by the Prior Probability of a car being red, 0.40. The result is $(0.70 / 0.76) \times (0.40) = 0.37$ or 37%. From Session 2, Reading 8, LOS e, (Part 1)

27. Answer was A) $HPR = [\text{Dividend} + (\text{Ending price} - \text{Beginning price})] / \text{Beginning price}$ $0.14 = [2 + (30 - P)] / P$

$$1.14P = 32 \text{ so } P = \$28.07 \quad \text{From Session 2, Reading 6, LOS b}$$

28. Answer was D) shareholder wealth is the goal of financial management. Focusing on the maximization of earnings does not consider the differences in risk across projects, while focusing on revenues precludes concern for the expenses incurred. Earning a higher return on a small project provides less of a benefit than earning a slightly lower rate of return on a much larger project. From Session 2, Reading 6, LOS a, (Part 2)

29. Answer was D) 1,300% 10,947,544%

$$\text{Stated Weekly Rate} = 5/4 - 1 = 25\%$$

$$\text{Stated Annual Rate} = 1,300\%$$

$$\text{Annual Effective Interest Rate} = (1 + 0.25)^{52} - 1 = 109,476.44 - 1 = 10,947,544\% \quad \text{From Session 2, Reading 5, LOS c, (Part 1)}$$

30. Answer was A) $\ln(18,682/10,000) = 0.6250/5 = 12.50\%$

$$\text{Or: } (18,682/10,000)^{1/5} = 1.133143$$

$$\ln(1.133143) = 12.4995\% \quad \text{From Session 2, Reading 5, LOS c, (Part 2)}$$

31. Answer was A)

<i>N</i>	<i>i</i>	<i>FV</i>	<i>PV</i>
0	12	100	100.00
1	12	200	178.57
2	12	400	318.88
<u>3</u>	<u>12</u>	<u>300</u>	<u>213.53</u>
			810.98

From Session 2, Reading 5, LOS d, (Part 2)

32. Answer was A) By the formula for joint probability:

$$P(AB) = P(A|B) \times P(B), \text{ since } P(B) \leq 1, \text{ then } P(AB) \leq P(A|B).$$

None of the other choices must hold. From Session 2, Reading 8, LOS e, (Part 3)

33. Answer was A)

The joint probability of independent events is obtained by multiplying the probabilities of the individual events together:

$$(0.40) \times (0.40) = 0.16 \text{ or } 16\%. \quad \text{From Session 2, Reading 8, LOS a}$$

34. Answer was B) 0.00. These are mutually exclusive, so the joint probability is zero. From Session 2, Reading 8, LOS e, (Part 1)

35. Answer was D) 10.71% 12% 12%, The mean is the average return computed by summing the returns and dividing by the number of investments: $75 / 7 = 10.71\%$.

The median is the mid-point or central number of returns arranged from highest to lowest or lowest to highest. In this case: 7, 8, 9, **12**, 12, 13, 14. The median return is 12%.

The mode is the return that occurs most frequently. In this case, 12% is also the mode. From Session 2, Reading 7, LOS d

36. Answer was D) Mode, median, mean. In a positively skewed distribution, the mode is less than the median, which is less than the mean. From Session 2, Reading 7, LOS i, (Part 2)

37. Answer was D) 4.26%. $(\$2,035 / \$100,000) \times (360 / 172) = 0.04259 = 4.26\% = \text{bank discount yield}$. From Session 2, Reading 6, LOS d, (Part 1)

38. Answer was A) Since there are twice as many male employees to female employees, $p(\text{male}) = 2/3$ and $p(\text{female})$

= 1/3. Therefore, the probability of 4 Successes = $(0.333)^4 = 0.0123$. From Session 2, Reading 8, LOS e, (Part 3)

$0.5000 \times 0.5000 \times 0.1667 \times 0.1667 = 0.0069$. From Session 2, Reading 8, LOS e, (Part 3)

39. Answer was B) 1.7%. The standard deviation is the positive square root of the variance. The variance is the expected value of the squared deviations around the expected value, weighted by the probability of each observation. The expected value is: $(0.5) \times (0.12) + (0.3) \times (0.1) + (0.2) \times (0.15) = 0.12$. The variance is: $(0.5) \times (0.12 - 0.12)^2 + (0.3) \times (0.1 - 0.12)^2 + (0.2) \times (0.15 - 0.12)^2 = 0.0003$. The standard deviation is the square root of $0.0003 = 0.017$ or 1.7%. From Session 2, Reading 8, LOS k

46. Answer was B) 0.04 and 0.19. The correlation coefficient is: $0.06974 / [(Std Dev A)(Std Dev B)] = 0.8$. $(Std Dev A)(Std Dev B) = 0.08718$. Since the standard deviation is equal to the square root of the variance, each pair of variances can be converted to standard deviations and multiplied to see if they equal 0.08718. $\sqrt{0.04} = 0.20$ and $\sqrt{0.19} = 0.43589$. The product of these equals 0.08718. From Session 2, Reading 8, LOS j

40. Answer was C) 64.2%. Using the addition rule, the probability of being accepted at Harvard or Yale, but not both, is equal to: $P(\text{Harvard}) + P(\text{Yale}) - P(\text{Harvard and Yale}) = 0.25 + 0.42 - 0.028 = 0.642$ or 64.2%. From Session 2, Reading 8, LOS e, (Part 2)

47. Answer was C) \$751. Compute the present value of the perpetuity at $(t=3)$. Recall, the present value of a perpetuity or annuity is valued one period before the first payment. So, the present value at $t=3$ is $100 / 0.10 = 1,000$. Now it is necessary to discount this lump sum to $t=0$. Therefore, present value at $t=0$ is $1,000 / (1.10)^3 = 751$. From Session 2, Reading 5, LOS d, (Part 3)

41. Answer was C) is more peaked than a normal distribution. A distribution with positive excess kurtosis is one that is more peaked than a normal distribution. From Session 2, Reading 7, LOS j

48. Answer was A) Using the multiplication rule: $(0.25)(0.42) \times (0.25)(0.15)(0.42) = 0.08925$ or 8.9%. From Session 2, Reading 8, LOS e, (Part 3)

42. Answer was B) 64.5 8.0
The sample variance is found by taking the sum of all squared deviations from the mean and dividing by $(n - 1)$. $[(15 - 3)^2 + (2 - 3)^2 + (5 - 3)^2 + (-7 - 3)^2 + (0 - 3)^2] / (5 - 1) = 64.5$ The sample standard deviation is found by taking the square root of the sample variance. $\sqrt{64.5} = 8.03$ From Session 2, Reading 7, LOS f

49. Answer was A) The sample standard deviation equals the square root of the sum of the squares of the position returns less the mean return, divided by the number of observations in the sample *minus one*.

Position	Return (%)	$(\text{Return Mean})^2$
A	1.3	0.60
B	1.4	0.46
C	2.2	0.02
D	3.4	1.76
Mean	$8.3/4 = 2.075$	Sum = 2.83
Std. Dev. = $(2.83 / 4 - 1)^{0.5} = 0.97$		

43. Answer was B) 5.79%. Holding Period Yield = $4.0127\% = 5.665\% \times (255/360)$
Effective Annual Yield = $(1.040127)^{365/255} - 1 = 5.79\%$. From Session 2, Reading 6, LOS d, (Part 2)

From Session 2, Reading 7, LOS f

44. Answer was A) Using the total probability rule, we can compute the $P(B)$: $P(B) = [P(B|A) \times P(A)] + [P(B|A^c) \times P(A^c)]$
 $P(B) = [0.5 \times 0.4] + [0.2 \times 0.6] = 0.32$ Using Bayes's formula, we can solve for $P(A|B)$:
 $P(A|B) = [P(B|A) / P(B)] \times P(A) = [0.5 / 0.32] \times 0.4 = 0.625$
From Session 2, Reading 8, LOS m

50. Answer was B) Investment A offers a \$53.18 greater return. Investment A: $I = 7.25 / 4$; $N = 2 \times 4 = 8$; $PV = \$50,000$; $PMT = 0$; $CPT \rightarrow FV = \$57,726.98$
Investment B: $I = 7.40$; $N = 2$; $PV = \$50,000$; $PMT = 0$; $CPT \rightarrow FV = \$57,673.80$ Difference = investment A offers a \$53.18 greater dollar return. From Session 2, Reading 5, LOS e

45. Answer was D) 0.0069. For the four independent events defined here, the probability of the specified outcome is

51. Answer: $(1 + 0.12 / 4)^4 - 1 = 1.1255 - 1 = 0.1255$. From Session 2, Reading 5, LOS c, (Part 1)

52. Answer was D) 6. $300 - 400 = 1$, $400 - 500 = 2$, $500 - 600 = 3$, $600 - 700 = 4$, $700 - 800 = 5$, $800 - 900 = 6$, Total = 6

From Session 2, Reading 7, LOS b

53. Answer was C) $P(\text{earnings increase} \mid \text{dividend increase})$ is not equal to $P(\text{earnings increase})$. If two events A and B are dependent, then the conditional probabilities of $P(A|B)$ and $P(B|A)$ will not equal their respective unconditional probabilities (of $P(A)$ and $P(B)$, respectively). The other choices may or may not occur, e.g., $P(A \mid B) = P(B)$ is possible but not necessary. From Session 2, Reading 8, LOS f

54. Answer was A) $[0.30 \times (0.15 - 0.066)^2 + 0.70 \times (0.03 - 0.066)^2]^{1/2} = 5.5\%$. From Session 2, Reading 8, LOS k

55. Answer was C) refining a forecast because of the occurrence of some other event. Conditional expected values are contingent upon the occurrence of some other event. The expectation changes as new information is revealed. From Session 2, Reading 8, LOS h

56. Answer was C) It has a lower percentage of small deviations from the mean than a normal distribution. A distribution with positive excess kurtosis has a higher percentage of small deviations from the mean than normal. So it is more peaked than a normal distribution. A distribution with positive skew has a mean $>$ mode. From Session 2, Reading 7, LOS j

57. Answer was D) \$901,060. $N = 45$; $PMT = 2,000$; $PV = 0$; $I/Y = 8.5\%$; $CPT \rightarrow FV = \$901,060.79$. From Session 2, Reading 5, LOS d, (Part 2)