3 PROBABILITY CONCEPTS

1. Use the following data to calculate the standard deviation of the
   - 50% chance of a 12% return
   - 30% chance of a 10% return
   - 20% chance of a 1 5% return

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

2. The probability that interest rates will increase this year is 40%, and the probability that inflation will be over 2% is 30%. If inflation is over 2%, the probability of an increase in interest rates is 50%. The probability that inflation will be over 2% or interest rates increase this year is:

   (A) 20%.
   (B) 55%.
   (C) 70%.

3. The following table summarizes the availability of trucks with air bags and bucket seats at a dealership.

	Bucket Seats	No Bucket Seats	Total
Air Bags	75	50	125
No Air Bags	35	60	95
Total	110	110	220

   What is the probability of randomly selecting a truck with air bags and bucket seats?

   (A) 28%.
   (B) 16%.
   (C) 34%.

4. There is a 50% probability that the Fed will cut interest rates tomorrow. On any given day, there is a 67% probability the DJIA will increase. On days the Fed cuts interest rates, the probability the DJIA will go up is 90%. What is the probability that tomorrow the Fed will cut interest rates or the DJIA will go up?

   (A) 0.95.
   (B) 0.33.
   (C) 0.72

5. Jay Hamilton, CFA, is analyzing Madison, Inc., a distressed firm. Hamilton believes the firm's survival over the next year depends on the state of the economy. Hamilton assigns probabilities to four economic growth scenarios and estimates the probability of bankruptcy for Madison under each:

Economic growth scenario	Probability of scenario	Probability of bankruptcy
Recession (< 0%)	20%	60%
Slow growth (0% to 2%)	30%	40%
Normal growth (2% to 4%)	40%	20%
Rapid growth (> 4%)	10%	10%

Based on Hamilton's estimates, the probability that Madison, Inc. does not go bankrupt in the next year is closest to:

(A) 33%.

(B) 18%

(C) 67%

6. A conditional expectation involves:

(A) refining a forecast because of the occurrence of some other event.

(B) calculating the conditional variance.

(C) determining the expected joint probability.

7. A supervisor is evaluating ten subordinates for their annual performance reviews. According to a new corporate policy, for every ten employees, two must be evaluated as "exceeds expectations," seven as "meets expectations," and one as "does not meet expectations." How many different ways is it possible for the supervisor to assign these tings?

(A) 360.

(B) 10,080.

(C) 5,040.

8. Pat Binder, CFA, is examining the effect of an inverted yield curve on the stock market. She determines that in the past century, when the yield curve has inverted, a bear market ensued 75% of the time. Binder believes the probability of an inverted yield curve in the next year is 20%. The probability that there will be an inverted yield curve next year followed by a bear market is closest to:

(A) 75%

(B) 20%

(C) 15%

9. A firm is going to divide 12 employees into three teams of four. How many ways can the 12 employees be selected for the three teams?

(A) 34,650.

(B) 3,326,400.

(C) 144.

10. Use the following probability distribution to calculate 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%.

11. There is a 40% probability that the economy will be good next and 60% probability that it will be bad. if the economy is good, there is 50 percent probability of a bull market, a 30% probability of a normal market, and a 20% probability of a bear market. If the economy is bad, there is a 20% probability of a bull market, a 30% probability of a normal market, and a 50% probability of a good economy and bull market?
(A) 12%.
(B) 50%.
(C) 20%.

12. if given the standard deviations of the returns of two assets and the correlation between the two assets, which of the following would an analyst least likely be able to derive from these?
(A) Strength of the linear relationship between the two.
(B) Expected returns.
(C) Covariance between the returns.

13. The joint probability function for returns on an equity index (Rl) and returns on a stock (RS) is given in the following table:

	Returns on Index (R)		
Return on stock (R_S)	$R_I = 0.16$	$R_I = 0.02$	$R_I = -0.10$
$R_S = 0.24$	0.25	0.00	0.00
$R_S = 0.03$	0.00	0.45	0.00
$R_S = -0.1\ 5$	0.00	0.00	0.30

Covariance between stock return and index return is closes to:
(A) 0.029.
(B) 0.014.
(C) 0.019.

14. An analyst has a list of 20 bonds of which 14 are callable, and five have warrants attached to them. Two of the callable bonds have warrants attached to them. If a single bond is chosen at random, what is the probability of choosing a callable bond or a bond with a warrant?
(A) 0.85.
(B) 0.55.
(C) 0.70.

15. 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) 10.5%

(B) 3.8%

(C) 8.9%

16. The unconditional probability of an event, given conditional probabilities, is determined by using the:

(A) addition rule of probability.

(B) multiplication rule of probability.

(C) total probability rule.

17. The probability that tomorrow's high temperature will be below 32 degrees F is 20%. The probability that tomorrow's high temperature will be above 40 degrees F is 10%. These two events are:

(A) exhaustive.

(B) mutually exclusive.

(C) independent.

18. The probability of a good economy is 0.55 and the probability of a poor economy is 0.45. Given a good economy, the probability that the earnings of Home Builder Inc. will increase is 0.60 and the probability that earnings will not increase is 0.40. Given a poor economy, the probability that earnings will increase is 0.30 and the probability that earnings will not increase is 0.70. The unconditional probability that earnings will increase is closest to:

(A) 0.18.

(B) 0.33.

(C) 047.

19. 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.

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

(A) 28%.

(B) 88%.

(C) 76%.

20. Data shows that 75 out of 100 tourists who visit New York City visit the Empire State Building. It rains or snows in New York City one day in five. What is the joint probability that a randomly chosen tourist visits the Empire State Building on a day when it neither rains nor snows?

(A)   15%

(B)   95%

(C)   60%

21. Avery Scott, financial planner, recently obtained his CFA Charter and is considering multiple job offers. Scott devised the following four criteria to help him decide which offers to pursue most aggressively.

Criterion	% Expected to Meet the Criteria
(1) Within 75 Miles of San Francisco	0.85
(2) Employee Size less than 50	0.50
(3) Compensation package exceeding $100,000	0.30.
(4) Three weeks of vacation	0.15

If Scott has 20 job offers and the probabilities of meeting each criterion are independent, how many are expected to meet all of his criteria? (Round to nearest whole number).

(A)   0.

(B)   1.

(C)   3.

22. Assume two stocks are perfectly negatively correlated. Stock A has a standard deviation of 10.2% and stock B has a standard deviation of 13.9%. What is the standard deviation of the portfolio if 75% is invested in A and 25% in B?

(A)   0.00%.

(B)   0.17%.

(C)   4.18%.

23. Given the following probability distribution, find the standard deviation of expected returns.

Event	$P(R_A)$	R_A
Recession	0.10	-5%
Below Average	0.30	-2%
Normal	0.50	10%
Boom	0.10	31%

(A)   12.45%

(B)   7.00%

(C)   10.04&

24. Joe Mayer, CFA, projects that XYZ Company's return on equity varies with the state of the economy in the following way:

| State of Economy	Probability of Occurrence	Company Returns
Good	.20	20%
Normal	.50	15%
Poor	.30	10%

The standard deviation of XYZ's expected return on equity is closest to:

(A)   3.5%.

(B)   1.5%.

(C)   12.3%.

25. The probability of rolling a 3 on the fourth roll of a fair 6-sided die:

(A)   depends on the results of the three previous rolls.

(B)   is 1/6 to the fourth power.

(C)   is equal to the probability of rolling a 3 on the first roll.

26. There is a 40% probability that the economy will be good next year and a 60% probability that it will be bad. If the economy is good, there is a 50 percent probability of a bull market, a 30% probability of a normal market, and a 20% probability of a bear market. If the economy is bad, there is a 20% probability of a bull market, a 30% probability of a normal market, and a 50% probability of a bear market. What is the probability of a bull market next year?

(A)   50%.

(B)   20%.

(C)   32%.

27. Compute the standard deviation of a two-stock portfolio if stock A (40% weight) has a variance of 0.0015, stock B (60% weight) has a variance of 0.0021, and the correlation coefficient for the two stocks is -0.35?

(A)   264%.

(B)   0.07%.

(C)   13%.

28. If the odds against an event occurring are twelve to one, what is the probability that it will occur?

(A)   0.0833.

(B)   0.0769.

(C)   0.9231.

29. If two events are mutually exclusive, the probability that they both will occur at the same time is:
   (A) Cannot be determined from the information given.
   (B) 0.00.
   (C) 0.50

30. The covariance of the returns on investments X and Y is 18.17. The standard deviation of returns on X is 7%, and the standard deviation of returns on Y is 4%. What is the value of the correlation coefficient for returns on investments X and Y?
   (A) +0.85.
   (B) +0.32.
   (C) +0.65.

31. Which probability rule determines the probability that two events will both occur?
   (A) The addition rule.
   (B) The multiplication rule.
   (C) The total probability rule.

32. The returns on assets C and D are strongly correlated with a correlation coefficient of 0.80. The variance of returns on C is 0.0009, and the variance of returns on D is 0.0036. What is the covariance of returns on C and D?
   (A) 0.00144.
   (B) 0.03020.
   (C) 0.40110.

33. Helen Pedersen has all her money invested in either of two mutual funds (Y and Z). She knows that there is a 40% probability that Fund Y will rise in price and a 60% probability that Fund Z will rise in price if Fund Y rises in price. What is the probability that both Fund Y and Fund Z will rise in price?
   (A) 0.40.
   (B) 0.24.
   (C) 1.00.

34. An investor has two stocks, Stock R and Stock S in her portfolio. Given the following information on the two stocks, the portfolio's standard deviation is closest to:
   • $\sigma_R = 34\%$
   • $\sigma_S = 16\%$
   • $r_{R,S} = 0.67$
   • $W_R = 80\%$
   • $W_S = 20\%$
   (A) 7.8%.
   (B) 8.7%.
   (C) 29.4%.

35. Tina O'Fahey, CFA, believes a stock's price in the next quarter depends on two factors: the direction of the overall market and whether the company's next earnings report is good or poor. The possible outcomes and some probabilities are illustrated in the tree diagram shown below:
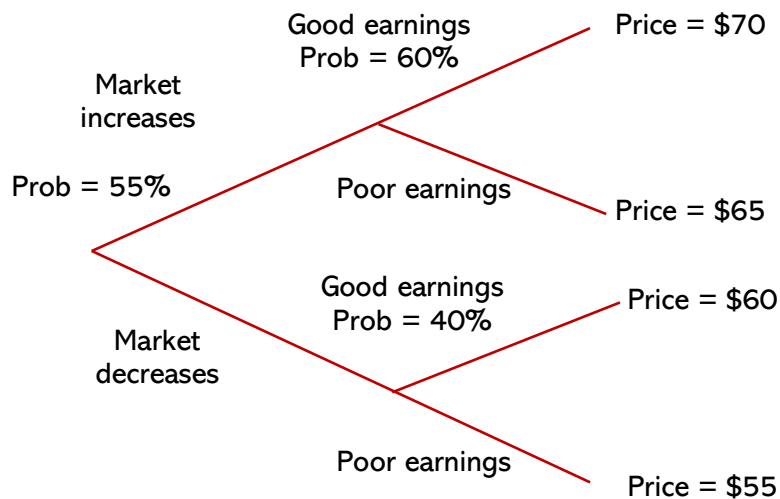
Based on this tree diagram, the expected value of the stock if the market decreases is closest to:

(A) $26.00.

(B) $57.00.

(C) $62.50.
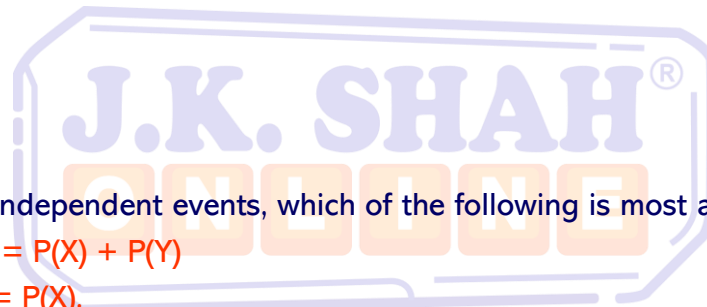
36. If X and Y are independent events, which of the following is most accurate?

(A)   P(X or Y) = P(X) + P(Y)

(B)   P(X | Y) = P(X).

(C)   P(X or Y) = (P(X)) x (P(Y)).

37. The covariance of returns on two investments over a 10-year period is 0.009. If the variance of returns for investment A is 0.020 and the variance of returns for investment B is 0.033, what is the correlation coefficient for the returns?

(A)   0.350.

(B)   0.687.

(C)   0.444.

38. Based on historical data, Metro Utilities increases its dividend in 80% of years when GDP increases and 30% of years in which GDP decreases. An analyst believes that there is a 30% probability that GDP will decrease next year. Based on these data and estimates, the probability that GDP will increase next year and Metro will increase its dividend is:

(A)   14%.

(B)   24%.

(C)   56%.

39. The events Y and Z are mutually exclusive and exhaustive: P(Y) = 0.4 and P(Z) = 0.6. If the probability of X given Y is 0.9, and the probability of X given Z is 0.1, what is the unconditional probability of X?

   (A)   0.33.
   (B)   0.40.
   (C)   0.42.

40. Tully Advisers, Inc., has determined four possible economic scenarios and has projected the portfolio returns for two portfolios for their client under each scenario. Tully's economist has estimated the probability of each scenario as shown in the table below. Given this information, what is the expected return on Portfolio A?

Scenario	Probability	Return on Portfolio A	Return on Portfolio B
A	15%	17%	19%
B	20%	14%	18%
C	25%	12%	10%
D	40%	8%	9%

   (A)   12.75%
   (B)   11.55%
   (C)   12.55%

41. Firm A can fall short, meet, or exceed its earnings forecast. Each of these events is equally likely. Whether firm A increases its dividend will depend upon these outcomes. Respectively, the probabilities of a dividend increase conditional on the firm falling short, meeting or exceeding the forecast are 20%, 30%, and 50%. The unconditional probability of a dividend increase is:

   (A)   1.000.
   (B)   0.333.
   (C)   0.500.

42. An empirical probability is one that is:

   (A)   supported by formal reasoning.
   (B)   determined by mathematical principles.
   (C)   derived from analyzing past data.

43. If the probability of an event is 0.10, what are the odds for the event occurring?

   (A)   One to ten.
   (B)   One to nine.
   (C)   Nine to one.

44. An investor is considering purchasing ACQ. There is a 30% probability that ACQ will be acquired in the next two months. If ACQ is acquired, there is a 40% probability of earning a 30% return on the investment and a 60% probability of earning 25%. If ACQ is not acquired, the expected return is 12%. What is the expected return on this investment?

(A) 12.3%.

(B) 16.5%.

(C) 18.3%.

45. If the probability of both a new Wal-Mart and a new Wendy's being built next month is 68% and the probability of a new Wal-Mart being built is 85%, what is the probability of a new Wendy's being built if a new Wal-Mart is built?

(A) 0.60.

(B) 0.80.

(C) 0.70.

46. In a given portfolio, half of the stocks have a beta greater than one of those with a beta greater than one, a third are in a computer-related business. What is the probability of a randomly drawn stock from the portfolio having both a beta greater than one and being in a computer-related business?

(A) 0.667.

(B) 0.333.

(C) 0.167.

47. The multiplication rule of probability is used to calculate the:

(A) joint probability of two events.

(B) unconditional probability of an event, given conditional probabilities.

(C) probability of at least one of two events.

48. A bag of marbles contains 3 white and 4 black marbles. A marble will be drawn from the bag randomly three times and put back into the bag. Relative to the outcomes of the first two draws, the probability that the third marble drawn is white is:

(A) dependent.

(B) independent.

(C) conditional.

49. Which of the following statements about counting methods is least accurate?

(A) The labelling formula determines the number of different ways to assign a given number of different labels to a set of objects.

(B) The combination formula determines the number of different ways a group of objects can be drawn in a specific order from a larger sized group of objects.

(C) The multiplication rule of counting is used to determine the number of different ways to choose one object from each of two or more groups.

50. If the probability of an event is 0.20, what are the odds against the event occurring?

(A) Five to one.

(B) Four to one.

(C) One to four.

51. The following table summarizes the results of a poll taken of CEO's and analysts concerning the economic impact of a pending piece of legislation:

Group	Think It will have a positive impact	Think it will have a negative impact	Total
CEO's	40	30	70
Analysts	70	60	130
	110	90	200

What is the probability that a randomly selected individual from this group will be either an analyst or someone who thinks this legislation will have a positive impact on the economy?

(A) 0.80.

(B) 0.85.

(C) 0.75.

52. Tully Advisers, Inc., has determined four possible economic scenarios and has projected the portfolio returns for two portfolios for their client under each scenario. Tully's economist has estimated the probability of each scenario, as shown in the table below. Given this information, what is the standard deviation of returns on portfolio A?

Scenario	Probability	Return on Portfolio A	Return on Portfolio B
A	15%	18%	19%
B	20%	17%	18%
C	25%	11%	10%
D	40%	7%	9%

(A) 4.53%.

(B) 1.140%.

(C) 5.992%.

53. 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) 0.375.

(B) 0.625.

(C) 0.125.

54. The probability of a new office building being built in town is 64%. The probability of a new office building that includes a coffee shop being built in town is 58%. If a new office building is built in town, the probability that it includes a coffee shop is closest to:

(A) 58%.

(B) 37%.

(C) 91%.

55. Which of the following is an empirical probability?

(A) On a random draw, the probability of choosing a stock of a particular industry from the S&P 500 based on the number of firms.

(B) For a stock, based on prior patterns of up and down days, the probability of the stock having a down day tomorrow.

(C) The probability the Fed will lower interest rates prior to the end of the year.

56. Use the following probability distribution.

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

The expected return for the portfolio is:

(A) 6.6%.

(B) 8.1%.

(C) 9.0%.

57. The probabilities of earning a specified return from a portfolio are shown below:

Probability	Return
0.20	10%
0.20	20%
0.20	22%
0.20	15%
0.20	25%

What are the odds of earning at least 20%?

(A) Three to five.

(B) Three to two.

(C) Two to three.

58. 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.

59. What is the standard deviation of a portfolio if you invest 30% in stock one (standard deviation of 4.6%) and 70% in stock two (standard deviation of 7.8%) if the correlation coefficient for the two stocks is 0.45?

(A) 6.83%
(B) 6.20%
(C) 0.38%

60. Personal Advisers, Inc., has determined four possible economic scenarios and has projected the portfolio returns for two portfolios for their client under each scenario. Personal's economist has estimated the probability of each scenario as shown in the table below. Given this information, what is the covariance of the returns on Portfolio A and Portfolio B?

Scenario	Probability	Return on Portfolio A	Return on Portfolio B
A	15%	18%	19%
B	20%	17%	18%
C	25%	11%	10%
D	40%	7%	9%

(A) 0.890223.
(B) 0.001898.
(C) 0.002019.

61. The following table shows the weightings and expected returns for a portfolio of three stocks:

Stock	Weight	E(R_X)
V	0.40	12%
M	0.35	8%
S	0.25	5%

What is the expected return of this portfolio?
(A) 9.05%.
(B) 8.85%.
(C) 8.33%.

62. A two-sided but very thick coin is expected to land on its edge twice out of every 100 flips. And the probability of face up (heads) and the probability of face down (tails) are equal. When the coin is flipped, the prize is $1 for heads, $2 for tails, and $50 when the coin lands on its edge.

What is the expected value of the price on a single coin toss?
(A) $17.67.
(B) $1.50.
(C) $2.47.

63. Determining the number of ways five tasks can be done in order, requires:

(A) only the factorial function.

(B) the labeling formula.

(C) the permutation formula.

64. The following table summarizes the results of a poll taken of executives and analysts concerning the economic impact of a pending piece of legislation:

Group	Think it will have a positive impact	Think it will have a negative impact	Total
Executives	40	30	70
Analysts	70	60	130
	110	90	200

What is the probability that a randomly selected individual from this group will be an analyst that thinks that the legislation will have a positive impact on the economy?

(A) 0.35.

(B) 0.6464.

(C) 0.3575.
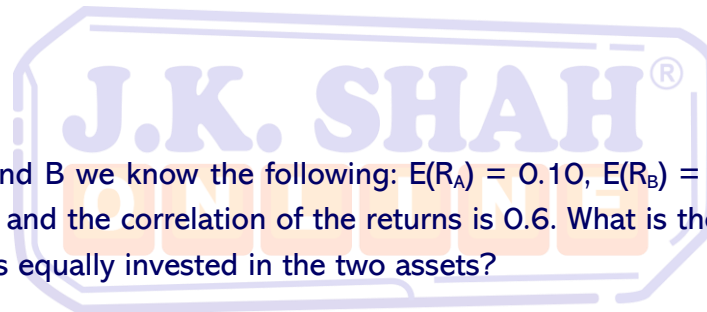
65. For assets A and B we know the following: $E(R_A) = 0.10$, $E(R_B) = 0.20$, $Var(R_A) = 0.25$, $Var(R_B) = 0.36$ and the correlation of the returns is 0.6. What is the expected return of a portfolio that is equally invested in the two assets?

(A) 0.1500.

(B) 0.3050.

(C) 0.2275.

66. 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 being either a nonsmoker or 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) 0.88.

(B) 0.50.

(C) 0.38.

67. For two random variables, P(X = 2, Y = 10) = 0.3, P(X = 6, Y = 2.5) = 0.4, and P(X = 10, Y = 0) = 0.3. Given that E(X) is 6 and E(Y) is 4, the covariance of X and Y is:
(A) -12.0.
(B) 24.0.
(C) 6.0.

68. A very large company has equal amounts of male and female employees. If a random sample of four employees is selected, what is the probability that all four employees selected are female?
(A) 0.1600
(B) 0.0625.
(C) 0.0256

69. A portfolio manager wants to eliminate four stocks from a portfolio that consists of six stocks. How many ways can the four stocks be sold when the order of the sales is important?
(A) 180.
(B) 360.
(C) 24.

70. Which of the following statements about probability is most accurate?
(A) An outcome is the calculated probability of an event.
(B) An event is a set of one or more possible values of a random variable.
(C) A conditional probability is the probability that two or more events will happen concurrently.

71. A company has two machines that produce widgets. An older machine produces 16% defective widgets, while the new machine produces only 8% defective widgets. In addition, the new machine employs a superior production process such that it produces three times as many widgets as the older machine does. Given that a widget was produced by the new machine, what is the probability it is NOT defective?
(A) 0.06.
(B) 0.76.
(C) 0.92.

72. The following table summarizes the availability of trucks with air bags and bucket seats at a dealership.

	Bucket Seats	No Bucket Seats	Total
Air Bags	75	50	125
No Air Bags	35	60	95
Total	110	110	220

What is the probability of selecting a truck at random that has either air bags or bucket seats?

(A) 34%

(B) 73%

(C) 107%

73. Bonds rated B have a 25% chance of default in five years. Bonds rated CCC have a 40% chance of default in five years. A portfolio consists of 30% B and 70% CCC-rated bonds. If a randomly selected bond defaults in a five-year period, what is the probability that it was a B-rated bond?

(A) 0.211.

(B) 0.250.

(C) 0.625.

74. Given P(X = 2) = 0.3, P(X = 3) = 0.4, P(X = 4) = 0.3. What is the variance of X?

(A) 0.3.

(B) 0.6.

(C) 3.0.

75. There is a 60% chance that the economy will be good next year and a 40% chance that it will be bad. If the economy is good, there is a 70% chance that XYZ Incorporated will have EPS of $5.00 and a 30% chance that their earnings will be $3.50. If the economy is bad, there is an 80% chance that XYZ Incorporated will have EPS of $1.50 and a 20% chance that their earnings will be $1.00. What is the firm's expected EPS?

(A) $3.29.

(B) $2.75.

(C) $5.95.

76. Which of the following statements about the defining properties of probability is least accurate?

(A) The sum of the probabilities of events equals one if the events are mutually exclusive and exhaustive.

(B) To state a probability, a set of mutually exclusive and exhaustive events must be defined.

(C) The probability of an event may be equal to zero or equal to one.

77. An unconditional probability is most accurately described as the probability of an event independent of:

(A) the outcomes of other events.

(B) an observer's subjective judgment.

(C) its own past outcomes.

78. The probabilities that the prices of shares of Alpha Publishing and Omega Software will fall below $35 in the next six months are 65% and 47%. If these probabilities are independent, the probability that the shares of at least one of the companies will fall below $35 in the next six months is:

(A) 0.31.

(B) 0.81.

(C) 1.00.

79. For assets A and B we know the following: $E(R_A) = 0.10$, $E(R_B) = 0.10$, $Var(R_A) = 0.18$, $Var(R_B) = 0.36$ and the correlation of the returns is 0.6. What is the variance of the return f a portfolio that is equally invested in the two assets?

(A) 0.1102.

(B) 0.1500.

(C) 0.2114.

80. An investment manager has a pool of five security analysts he can choose from to cover three different industries. In how many different ways can the manager assign one analyst to each industry?

(A) 125.

(B) 10.

(C) 60.

81. The following information is available concerning expected return and standard deviation of Pluto and Neptune Corporations:

	Expected Return	Standard Deviation
Pluto Corporation	11%	0.22
Neptune Corporation	9%	0.13

If the correlation between Pluto and Neptune is 0.25, determine the expected return and standard deviation of a portfolio that consists of 65% Pluto Corporation stock and 35% Neptune Corporation stock.

(A) 10.3% expected return and 16.05% standard deviation.

(B) 10.0% expected return and 16.05% standard deviation.

(C) 10.03% expected return and 2.58% standard deviation.

82. 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.

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

(A) 28%.

(B) 37%.

(C) 47%.

83. 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.

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

(A) 48 %

(B) 25 %

(C) 28 %

84. If Stock X has a standard deviation of returns of 18.9% and Stock Y has a standard deviation of returns equal to 14.73% and returns on the stocks are perfectly positively correlated, the standard deviation of an equally weighted portfolio of the two is:

(A) 16.82%.

(B) 10.25%.

(C) 14.67%.

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

(A) past lottery history.

(B) the best estimate of the Department of Gaming.

(C) a priori probability.

86. Last year, the average salary increase for poultry research assistants was 2.5%. Of the 10,000 poultry research assistants, 2,000 received raises in excess of this amount. The odds that a randomly selected poultry research assistant received a salary increase in excess of 2.5% are:

(A) 1 to 4.

(B) 1 to 5.

(C) 20%.

87. An analyst expects that 20% of all publicly traded companies will experience a decline in earnings next year. The analyst has developed a ratio to help forecast this decline. If the company has a decline in earnings, there is a 90% probability that this ratio will be negative. If the company does not have a decline in earnings, there is only a 10% probability that the ratio will be negative. The analyst randomly selects a company with a negative ratio. Based on Bayes' theorem, the updated probability that the company will experience a decline is:

(A) 18%.

(B) 26%.

(c) 69%.

88. A recent study indicates that the probability that a company's earnings will exceed consensus expectations equals 50%. From this analysis, the odds that the company's earnings exceed expectations are:

(A) 2 to 1.

(B) 1 to 2.

(C) 1 to 1.

89. A firm wants to select a team of five from a group of ten employees. How many ways can the firm compose the team of five?

(A) 25.

(B) 120.

(C) 252.

90. An analyst announces that an increase in the discount rate next quarter will double her earnings forecast for a firm. This is an example of a:

(A) use of Bayes' formula.

(B) conditional expectation.

(C) joint probability.

91. 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) 0.0069.

(B) 0.8333.

(c) 0.4167.

92. There is a 40% probability that an investment will earn 10%, a 40% probability that the investment will earn 12.5%, and a 20% probability that the investment will earn 30%. What are the mean expected return and the standard deviation of expected returns, respectively?

(A) 15.0%; 5.75%.

(B) 15.0%; 7.58%.

(C) 17.5%; 5.75%.

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

(A) P(A and B) = 0.

(B) P(A and B) = 0.08.

(C) P(B I A) = 0.20.

94. For two random variables, P(X = 20, Y = 0) = 0.4, and P(X = 30, Y = 50) = 0.6. Given that E(X) is 26 and E(Y) is 30, the covariance of X and Y is:
    (A)   120.00.
    (B)   125.00.
    (C)   25.00.

95. 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 suffering from allergies or being a smoker?

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

    (A)   0.12.
    (B)   0.88.
    (C)   0.38.

96. Which of the following is an a priori probability?
    (A)   For a stock, based on prior patterns of up and down days, the probability of having a down day tomorrow.
    (B)   On a random draw, the probability of choosing a stock of a particular industry from the S&P 500.
    (C)   An analyst's estimate of the probability the central bank will decrease interest rates this month.

97. john purchased 60% of the stocks in a portfolio, while Andrew purchased the other 40%. Half of john's stock-picks are considered good, while a fourth of Andrew's are considered to be good. If a randomly chosen stock is a good one, what is the probability john selected it?
    (A)   0.30.
    (B)   0.75.
    (C)   0.40.

98. A firm holds two $50 million bonds with call dates this week.
    •   The probability that Bond A will be called is 0.80.
    •   The probability that Bond B will be called is 0.30.
    The probability that at least one of the bonds will be called is closest to:
    (A)   0.86.
    (B)   0.50.
    (C)   0.24.

99. 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?

(A) 10.5%.

(B) 64.2%.

(C) 7.7%.

100. If the outcome of event A is not affected by event B, then events A and B are said to be:

(A) independent.

(B) mutually exclusive.

(C) conditionally dependent.

101. Given the following probability distribution, find the covariance of the expected returns for stocks A and B.

Event	$P(R_i)$	R_A	R_B
Recession	0.10	-5%	4%
Below Average	0.30	-2%	8%
Normal	0.50	10%	10%
Boom	0.10	31%	12%

(A) 0.00109.

(B) 0.00174.

(C) 0.00032.

102. A bond portfolio consists of four BB-rated bonds. Each has a probability of default of 24% and these probabilities are independent. What are the probabilities of all the bonds defaulting and the probability of all the bonds not defaulting, respectively?

(A) 0.00332; 0.33360.

(B) 0.04000; 0.96000.

(C) 0.96000; 0.04000.

103. An economist estimates a 60% probability that the economy will expand next year. The technology sector has a 70% probability of outperforming the market if the economy expands and a 10% probability of outperforming the market if the economy does not expand. Given the new information that the technology sector will not outperform the market, the probability that the economy will not expand is closest to:

(A) 54%.

(B) 33%.

(C) 67%.