1. Two events A and b are mutually exclusive then \( P(A \cap B) = \) ________ .

2. Two events A and B are independent then \( P(A \cap B) = \) __________.

3. If \( P(A) = .2 \) then probability of A’s complementary event is ( .4 / .6 / .8).

4. If A and B are mutually exclusive then \( P(A \cup B) = P(A) + P(B) \) ( T / F).

5. The addition rule of probability says that \( P(A \cup B) = \) ______________

6. If our data set has a normal bell shaped curve with \( \mu \) and \( \sigma^2 \) then the curve is symmetric around ________________.

7. If the random variable \( x \) has a normal distribution curve then the max value \( x \) may take ______ and min value \( x \) may take is __________

8. Let \( x \) be the amount of rain/day in Mobile then \( P(X = 1.05”) = \) __________

9. Draw a picture of standard normal curve to depict area to the right of 0.

10. Draw picture of standard normal curve to show \( P(z < 1.00) \)

Let \( X \sim N(50, \text{s.d.}=4) \). Answer the following questions

11. For \( x=50 \) the corresponding \( z \)-value is ( 4 / 2 / 0) tick one

12. For \( x = 30 \) the corresponding \( z \)-value is ( positive / negative )

13. For \( z = 2.00 \) the corresponding \( x \)-value is \( x = \)_________.

14. If we draw samples of size 4 then \( \bar{X} \sim N(50, 4) \) ( T / F)

15. If we draw samples of size 25 then \( \bar{X} \sim N(50, \) ________)

Let \( X \sim N(50, \text{s.d.}=2) \). Answer the following questions

16. For \( x=50 \) the corresponding \( z \)-value is ( 4 / 2 / 0) pick one

17. For \( x = 60 \) the corresponding \( z \)-value is ( positive / negative )

18. For \( z = 1.00 \) the corresponding \( x \)-value is \( x = \)_________.
19. If we draw samples of size 9 then \( \bar{X} \sim N(50, 4) \) \( \text{T/F} \)

20. If we draw samples of size 25 then \( \bar{X} \sim N(50, \_\_\_\_) \)

21. (sampling error / non sampling error ) occurs purely due to chance and we can not stop it.

22. If the parent population is normal then sampling distribution of sample mean is normal . (T / F)

23. If parent distribution is skewed (non-normal) the distribution of sample mean is normal provided ________________.

In a population of 1000 students 500 has GPA above 3.0. We draw a sample of 50 students and observed that 30 students have GPA above 3.0. then

24. population proportion = ________.

25. sample proportion = ________.

26. (sampling error / non sampling error ) is the fixable error.

27. If the parent population is normal then sampling distribution of sample mean is normal . (T / F)

28. If parent distribution is skewed (non-normal) the distribution of sample mean is ______________ provided we collect a large sample from population.

In a population of 1000 students 500 has GPA above 3.0. We draw a sample of 50 students and observed that 30 students have GPA above 3.0. then

29. population proportion = ________.

30. sample proportion = ________.

31. For a given population , parameter has a fixed value and sample statistic is a variable (T/ F)

32. A point estimator for \( \mu \) is the ________________.

33. In the interval estimation, an interval is constructed around a (point estimate / population parameter ) (pick one)
34. When the population standard deviation is not known, the value used in place is (range/interquartile range/sample standard deviation).

35. We want to construct a confidence interval with $\alpha=.02$ then the confidence level is ________________.

36. In the jury trial, jury makes a decision based on evidences provided, in testing of hypothesis we make a decision based on __________________________.

37. In the decision making process we may commit two types of errors namely type I error and type II error. Their probabilities are respectively denoted by $\alpha$ and $\beta$.

Mark the correct answer
   a. Increase in $\alpha$ causes increase in $\beta$
   b. Increase in $\alpha$ causes decrease in $\beta$
   c. None of the above.

38. In testing of hypothesis we control the probability of (type I error / type II error).

39. In the jury trial example, type I error is equivalent to punishing an innocent person, then in terms of $H_0$ and $H_1$, type I error is
   d. (do not reject $H_0$ | $H_0$ is true)
   e. (do not reject $H_1$ | $H_0$ is true)
   f. (reject $H_0$ | $H_0$ is true)
   g. (do not reject $H_1$ | $H_0$ is false)

40. In a small sample case draw a picture of rejection region of size .03 when the alternative hypothesis is $H_1: \mu \neq \mu_0$

41. In a certain test of hypothesis, p-value was .0444 then the $H_0$ gets rejected at (2.5% LOS, 5% LOS, 1% LOS)

42. A company psychologists wanted to test if company executives have job-related stress scores higher than those of university professors. Should she consider the samples as dependent or independent?

43. To test the hypothesis that mean blood pressure of university professors is lower than that of company executives, which of the following would you use: a left-tailed test / a two tailed test / a right tailed test.

44. In a two sample study, one of the sample was small with $n=23$ and the other sample was large with $n=48$. What will be the degrees of freedom of the t-distribution? (71/69/47/22)

45. A food company is planning to market a new type of frozen yogurt. However before marketing this yogurt, the company wants to find the percentage of the people like it. After gathering the sample data what kind test would you run? (one sample test for mean / testing for proportion / testing difference of means / none of the above).

46. In a pair of dependent samples, size of one sample is 25, then size of the other sample would be (50/26/25/24)
47. In testing the hypothesis about difference of means using dependent samples, we generate a new random variable \( d \) which is equal to \( \frac{x_1-x_2}{x_1+x_2} \left( \frac{x_1+2x_2}{2x_1} - x_2 \right) \).

48. The test statistic in the case in question 1 follows a (\( z \)-distribution, \( t \)-distribution / \( F \)-distribution).

49. What is(are) the degree(s) of freedom of the test statistic in case of question 1 (49 / 25 / 24 / none).

50. What is the assumption about the variable \( d \)?

51. An experiment consists of ‘rolling two dice’, Total number of possible outcomes of are ________.

52. Given two events satisfy the equality \( p(AB) = p(A) \) then \( A \) and \( B \) are called ______________ events.

53. Mutually exclusive events are always dependent on each other (T / F).

54. Probability of an event \( A \) is .15 then the probability of the complementary event will be ____________.

55. Complementary events are always mutually exclusive. (T / F).

56. To test a new medicine on the patients of certain lung disease, which is a more suitable method to collect the data? Census or sample survey?

57. A characteristic under study that assumes different values for different elements is called ________________.

58. In a certain survey the question asked is “whether the family has health insurance or not?” The response variable is (qualitative / quantitative).

59. Give an example of a quantitative variable.

60. Define simple random sample.

61. The important assumption which we make under classical approach of probability is __________________________.

62. The relative frequency approach gives us (exact/approximate) value of probability of an event.

63. \( A \) and \( B \) are two events in \( S \) then \( P(AB) = \) ______________.
64. If the A and B above are mutually exclusive then \( P(\text{A} \cup \text{B}) = \) ______________.

65. If \( A \) and \( B \) are independent events then \( P(\text{A} \cup \text{B}) = \) ______________

66. \( A \) and \( B \) are two mutually exclusive events then \( P(\text{A} \cap \text{B}) = \) _________________.

67. A function that assigns a numerical value to each outcome of a random experiment is called ____________________.

68. The two properties of the probability distribution of a discrete random variables are ___________________ and ____________________.

69. Given following probability distribution of a random variable:

<table>
<thead>
<tr>
<th>Value of x</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability of x</td>
<td>.16</td>
<td>.48</td>
<td>.36</td>
</tr>
</tbody>
</table>

\( P(x < 2) = \) _______________.

70. Use the above table (in question 4) \( P(1 \leq x \leq 2) = \) _______________.

71. The function through which we could assign a numerical value to each possible outcome a random experiment is called a random variable. (T / F)

72. Given values of \( x \) and \( P(x) \), check if it is a probability distribution

<table>
<thead>
<tr>
<th>values of ( x ): 0 1 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>( P(x): 0.21 \ 0.7 \ 0.09 )</td>
</tr>
</tbody>
</table>

(Yes / No)

73. What is the possible value of mean in question 2? ________________.

74. In how many ways we can choose 4 flavors out of 5 given flavors of ice cream?

75. A Bernoulli trial is a random experiment with ____________________.

76. Choosing 5 marbles from a box of 40 marbles (20 purple, 12 red, and 8 green) one at a time with replacement, keeping track of the number of red marbles chosen.

This procedure results in a binomial distribution (T / F).

77. In a binomial distribution, parameters are (15, 0.5), the mean of this distribution is ________.

78. \( X \) = Number of oil spills occurring off the Alaskan coast. \( X \) is a

a. discrete r.v.  b. continuous r.v.  c. none (tick one)
79. The normal distribution was invoked by the scientist named ____________________.

80. A normal distribution has two parameters, ___________ and ___________.

81. For a given population, values of population mean and population standard deviation are constant (T \ F)

82. The probability distribution of the sample mean x is called sampling distribution of x (T \ F)

83. The sampling error is the difference between value of a ______________ ______________ and corresponding population parameter.

84. Given that population distribution is normal with parameters     and then for n= 25, the sampling distribution of x is normal with parameters ____________________.

85. Given that the population distribution is not normal with mean and standard deviation then for n = 41, the distribution of sample mean x is ______________ with parameters ______________.

86. A statistical hypothesis is a claim about ____________________.

87. 2. The procedure to test a hypothesis is developed with an assumption that null hypothesis is true (T / F)

88. Probability of type I error is the probability of ____________________.

89. In the given two scenario shade the critical regions:

90. a)  H : = 17 Vs H : < 17

91. b) H : = 45.5 Vs H : = 45.5

92. For given to populations the point estimator for μ₁ - μ₂ ____________.

93. The standard deviation of the point estimator in question 1 is given by ______________.

94. Given two approximately normal populations (with unknown but equal standard deviations) two independent small samples are drawn, the point estimator for unknown population standard deviation is given by __________________ .

95. Two samples drawn from two samples are independent if ______________

______________________________ .

96. Confidence Interval for paired differences is given by the formula

______________________________ .