31. The cumulative frequency for the second class is:

    A. 20    B. 32    C. 28    D. 11

32. The mean is equal to

    A. 36    B. 37    C. 38.067    D. 39.629

33. The value of $y$ is:

    A. 46    B. 36    C. 14    D. 50

34. The value of $t$ is:

    A. 23    B. 54    C. 47    D. 52

35. The value of $w$ is:

    A. 31    B. 68    C. 37    D. 60

36. The variance is equal to

    A. 13.898    B. 14.29    C. 106.12    D. 12.282

37. The standard deviation is equal to

    A. 10.3    B. 14.29    C. 13.898    D. 12.282

38. The coefficient of variation is equal to

    A. 18.76%    B. 14.29%    C. 28.6%    D. 12.282%

**Q.6 (1 point)**

39. A study is to be performed to determine a certain parameter in a community. From a previous study a standard deviation of 23 was obtained. If a sample error of up to 4 is to be accepted. the number of subjects should be included in this study at 99% level of confidence is

    A. 271    B. 124    C. 221    D. 213

**Q.7 (5 points)**

Suppose that $Z$ is distributed according to the standard normal distribution. **Use this information to answer questions 40 and 44.**

40. the mode of random variable $Z$ is

    Ⓐ 0    B. 0.24    C. 0.0925    D. 0.2133

41. $P(Z < 0) =$

    A. 0    B. 0.24    Ⓒ 0.5    D. 0.2133

42. $P(0 < Z < 0.67) =$

    Ⓐ 0.7486    B. 0.2486    C. 0.0925    D. 0.2133

43. $P(Z > 0.67) =$

    Ⓐ 0.2514    B. 0.24    C. 0.0925    D. 0.2133

44. If $P(Z < k) = 0.995$ then $k =$

    A. 0.2133    B. 0.24    C. 0.0925    Ⓓ 2.58

**Q.8 (4 points):**

A random sample of size n = 30 is taken from a population which has the normal distribution with mean 8 and standard deviation 3. **Use this information to answer questions 45 and 48.**

45. The median of variable $X$ is

    A. 3    B. 30    C. 8    D. 64

46. $P(7 < X < 9) =$

    A. 0.2586    B. 0.24    C. 0.0925    D. 0.2133

47. $P(X < 9) =$

    A. 0.0925    B. 0.24    C. 0.6293    D. 0.2133

48. $P(X = 8) =$

    A. 0.654    B. 0.24    C. 0.0925    D. 0

**Q.9 (3 points):** Let $\pi$ the proportion of children who have not received vaccination in Riyadh. In a sample of 400 children taken from a school in Riyadh, we found that 37 have not received vaccination, use $\alpha=0.05$. **Answer the questions 49-52.**

49. The proportion in the sample is      $P = \dfrac{37}{400}$

    A. 0.24    B. 0.0925    C. 0.07    D. 0.2133

50. The point estimate for $\pi$ is      $\pi = P$

    A. 0.07    B. 0.24    C. 0.0925    D. 0.2133

51. The upper limit confidence interval for $\pi$ is   (+)    $\pi = P \pm Z_{1-\frac{\alpha}{2}} \cdot \sqrt{\dfrac{P(1-P)}{n}}$

    A. 0.12    B. 0.24    C. 0.0925    D. 0.2133

52. The lower limit confidence interval for $\pi$ is   (−)    $0.0925 \pm \boxed{Z_{0.975}} \sqrt{\dfrac{0.0925(1-\cdots)}{400}}$

    A. 0.12    B. 0.24    C. 0.06    D. 0.45

**Q.10 (8 points)**

Among 150 African-American men, the mean systolic blood pressure was 146 mm Hg with a standard deviation of 27. We wish to know if on the basis of these data. If we want to test the hypothesis that the mean systolic blood pressure for a population of African-American is greater than 140, **answer the questions 53-60.** Use $\alpha=0.05$.

53. The null hypothesis is   فرض العدم

    A. $H_0 : \mu = 140$    B. $H_0 : \mu \neq 140$    C. $H_0 : \mu > 140$    D. $H_0 : \mu < 140$

54. The Alternative hypothesis is

    A. $H_A : \mu = 140$    B. $H_A : \mu \neq 140$    C. $H_A : \mu > 140$    D. $H_A : \mu < 140$

55. The test statistic is

    A. $z_c = 1.18$    B. $z_c = 3.25$    C. $z_c = 2.72$    D. $z_c = 0.45$

56. We reject $H_0$ If

    A. $z_c \neq z_{\frac{\alpha}{2}}$    B. $z_c \neq z_\alpha$    C. $z_c > z_\alpha$    D. $z_c < z_\alpha$

57. The decision is

    A. we reject $H_0$    B. we reject $H_A$    C. we reject $H_0$ and reject $H_A$    D. we accept $H_0$ and reject $H_A$

58. The point estimate for $\mu$ is

    A. 315    B. 27    C. 146    D. 114

التقدير نقطي   $\boxed{\mu = \bar{X}}$

$\bar{X} = 146$

59. The lower limit confidence interval for $\mu$ is

    A. 159.78    B. 411.87    C. 141.7    D. 34.76

60. The upper limit confidence interval for $\mu$ is

    A. 150.3    B. 130.78    C. 144.29    D. 112.54

الإقبال

الرابع
الهيارئم

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Some useful values

$z_{0.975} = 1.96,$    $z_{0.995} = 2.58,$    $z_{0.95} = 1.645,$    $z_{0.99} = 2.33,$    $z_0 = 0.5,$    $z_{0.7486} = 0.67,$

$z_{0.6293} = 0.33,$    $z_{0.3707} = -0.33,$    $z_{0.7257} = 0.6,$    $z_{0.5793} = 0.2,$    $z_{0.2514} = -0.67,$

$z_{0.6293} = 0.33,$    $z_{0.2776} = -0.5,$    $z_{0.1379} = -1$

**Important instructions:**

- Only the Answer Table in the first page will be considered.
- For the true or false questions, fill the circle A for **true** and fill the circle B for **false** in the answer table.
- For the multiple-choice questions, fill only the circle in the Answer Table that corresponds to your answer choice.
- You are allowed to use a calculator.
- There are two empty pages for answer checking in the end of the exam.

**Q.1 (20 points): True or False questions.**

1. In questionnaires: Important target questions should be asked in the first of the opinion survey.

2. The median is not affected too much by extreme values. T

3. If all values are different or have the same frequency, there is no mode. T

4. The variance is a measure that uses the median as a point of reference. F

5. For the normal distribution, the mean, the median and the mode are different. F   are the same

6. Sampling scheme is a method of selecting sampling units from sampling frame T

7. A point estimation is a single number used to approximate the true value of the parameter. T ✓

8. The standard normal distribution is a special case of the normal distribution with mean $\mu = 1$ and variance $\rho^2 = 0$. F

9. Alternative hypothesis $H_A$: It is a statement of what we believe is true if our sample data cause us to reject the null hypothesis. T

10. Type I error occur when we rejecting $H_A$ and $H_A$ is true. F

11. P-value is the smallest value of $\alpha$ which we can accept $H_0$ F

12. A good point estimate for $\pi$ is $P$ T

13. One of the advantages of simple random sample is estimates are easy to calculate. T

14. In simple random sample, if sampling frame is large, the method will be impracticable. T

15. One of the disadvantages of cluster sampling will be statistically more efficient when the cluster elements are similar. T

16. Convenience sampling is often used during preliminary research efforts to get an estimate without incurring the cost or time required to select a random sample. T

17. Snowball sampling: is a special nonprobability method used when the desired sample characteristic is rare. T ✓

18. Cause-Specific Death Rate defined as the number of deaths assigned to a specific cause in a calendar year, divided by the population on July of that year

19. Crude Birthrate defined as the number of live births in a calendar year, divided by the population at July 1 of that year

20. General Fertility Rate defined as the number of live births in a calendar year, divided by the number of women ages 15-44 at midyear.

**Q.2 (3 points)** In questions 21-23: Find $\bar{x}$ In the sample data -2, 6, $\bar{x}$, 15, 14, 20 which make:

21. The sample mean of the data is 11

    A. 13    B. 10    C. 6.5    D. 13.33

22. The sample median of the data is 12:

    A. 8    B. 10    C. 9.5    D. 15

23. The sample mode of the data is 15

    A. 15    B. 14    C. 5    D. 20

*(handwritten)* $X = 13$, $-2, 6,$ , ③

**Q.3 (2 points)** In questions 24-25: For the sample data 6, 3, 5, 4, 2 :

24. The sample range of the data is

    A. 7    B. 5    C. 4    D. -1

*(handwritten)* $6 - 2 = 4$

25. The sample standard deviation of the data is

    A. 14    B. -5    C. 1.58    D. 2.5

*(handwritten)*
$$= \frac{(6-4)^2 + (3-4)^2 + (5-4)^2 + (4-4)^2 + (2-4)^2}{5-1}$$
$$= 2.5 \rightarrow \sqrt{2.5} = 1.58$$

**Q.4 (1 points)**

26. During calendar year 2006 the population for New Mexico city was 2,010,787 estimated in 2006 mid-year. there are 15,231 total deaths in New Mexico. The Crude death rate is

    A. 757.46 deaths per 100,000     B. 655.33 deaths per 100,000     C. 123.67 deaths per 100,000

    D. 432.98 deaths per 100,000

**Q.5 (12 points):** Using the Table below, answer the questions 27-38.

The following Table shows the ages of 50 patients seen in the emergency room of a hospital during a week :

| Age(years) | Frequency ($f_i$) | mid – point ($m_i$) | CumulativeFrequency | $m_i \times f_i$ | $m_i^2 \times f_i$ |
|---|---|---|---|---|---|
| 10 – 18 | 3 | 14 | 3 | 42 | 588 |
| 20 – 28 | 8 | 24 | 11 | 192 | 4608 |
| 30 – 38 | 20 | 34 | $w$ | 680 | 23120 |
| 40 – 48 | 9 14 | 44 | 45 | 616 | 27104 |
| 50 – 58 | 5 | $t$ | 50 | 270 | 14580 |

27. The true class interval for the third class is:     *(handwritten)* $\frac{9}{2} = \frac{2}{2} = 1$

    A. 19-29    B. 29-39    C. 39-49    D. 29-40

28. The appropriate graph is:

    A. pie chart    B. histogram    C. bar chart    D. stem and leaf

29. The relative frequency for the second class interval is:     *(handwritten)* $\frac{8}{50} = 0.16$

    A. 0.16    B. 0.24    C. 0.334    D. 0.2133

30. The percentage frequency for the third class interval is:

    A. 16%    B. 24%    C. 40%    D. 32%