

A. Given the data set of *ages of people* with diabetes

19, 16, 48, 23, 51, 19, 29, 16, 18, 42, 37, 27, 45, 18, **Compute the following**

1. Mean: $\bar{x} = 29.14$ 2. Median: 25 3. Mode: 16,18,19 4. Variance: 165.64 5. St. Dev: 12.87 6. Q1, Q2, Q3:18,25,42

7. Draw the Box- Plot and **comment** on it : **Ans: Skewed to the right.**

8. Apply all three empirical rules. $68\% = 29.14 \pm 12.87$, $95\% = 29.14 \pm 2(12.87)$, $99.7\% = 29.14 \pm 3(12.87)$,

B. A Marketing firm wished to determine whether or not the number of television commercials broadcast was linearly correlated to the sales of its product. The data, from several cities, are shown in the following table,

X= # of TV Commercials	12	6	9	15	11	15	8	16	12	6
Y= Sales Unit(Y)	17	15	11	16	13	10	5	12	14	9

9. Use the data and plot the data as a scattered diagram and **comment** on the pattern of the points.

10. Compute the correlation coefficient and **comment** on that. **Ans: $r = 0.3172$, No correlation**

11. Compute slope and y-intercept and write the equation of regression line: $a = .3115, b = 8.773$, $y = .3115x + 8.773$

12. Compute mean and standard deviation for both x and y variables: $\bar{x} = 11$, $\bar{y} = 12.2$, $s_x = 3.68$, $s_y = 3.61$

13. If no. of TV Commercials is 10, then use regress. Eq. and estimate sales. $y' = .31(10) + 8.773 = 11.875$

14. If sales is 13 units, then use regression Eq. and estimate no. of TV commercials. $13 = .31x' + 8.773 \Rightarrow x' = 13.63$

C.

Time(sec)	f	m	$f \times m$	$f \times m^2$
6 - 12	14			
12 - 18	8	15		
18 - 24	20		420	
24 - 30	6			
30 - 36	30			
36 - 42	14	39		
42 - 48	16		720	
48 - 54	12			
			3696	

Draw the

15. Histogram (write your observation)

16. Frequency polygon

Compute.

17. Mean? $\bar{x} = 30.8$

18. Standard deviation? **12.92**

19. Variance? **166.95**

20. Apply all three empirical rules. $68\% = 30.8 \pm 12.92$, $95\% = 30.8 \pm 2(12.92)$, $99.7\% = 30.8 \pm 3(12.92)$,

21) By decreasing the sample size what will happen to the proportion confidence interval (becomes wider/narrower)? For answer refer to part 3

22) By increasing the confidence level what will happen to the mean confidence interval (wider/narrower)? For answer refer to part 3

D. If out of 12 men and 14 women we select two people at random, find the probability that

23. Both men: 24. Both women: 25. One of each: **Answer: at the bottom of page 2**

E. If out of 10 Red balls and 12 Black balls we select two balls at random with replacement, find the probability that **26. Both Red: 27. Both black: 28. One of each: Answer: at the bottom of page 2**

F. Give an example of each sampling methods. G. What the outlier means in a regression problem?

H. What z-score value is considered to be unusual? I. What ordinary and unusual z-values mean?

J. What standard deviation is trying to measure? Give an example, and explain how it can be useful.

K. Give two examples of positively and two examples of negatively correlated variables.

L. What significant information histogram, box-plot curve intends to provide?

1. If 30 college students out of 80 graduate in 2 years, then by using 95% confidence level find the confidence interval for the proportion of all college students who graduate in 2 years. $\hat{p} = 37.5\%$, $E = 10.61\%$ $26.89 < P < 48.11$

2. If 40 college students out of 120 graduate in 2 years, then by using 90% confidence level find the confidence interval for the proportion of all college students who graduate in 2 years. $\hat{p} = 33.3\%$, $E = 7.08$ $26.22 < P < 40.38$

3. The scores for the test # 3 from Abe's stat classes from 8 randomly selected students are as such 84, 79, 95, 91, 75, 88, 78, 82. Find the confidence interval for the mean score for test # 3 for all Abe's stat classes.

$$E = 2.365 \frac{6.8868}{\sqrt{8}} = 5.7584 \quad \mu = 84 \pm 5.7584, \quad 78.2416 < \mu < 89.7584$$

4. How large should the sample size be if we want to estimate the true average time to finish a refinance application with 90% confidence level with a st. dev of 26 and the error is accepted to be 3 min? $n = 203$

5. How large should the sample size be if we want to estimate the true mean time to finish a refinance application with 90% confidence level when previous study results with a st. dev of 26 and the maximum error is accepted to be 1.5 min.? **What happened to sample size when error was cut in half?** $n = 813$

6. According to AMA. The average annual earnings of radiologists in the US is \$280,000 and those of surgeons are \$265,000. Suppose that these means are based on random samples of 380 radiologists and 450 surgeons and that the population standard deviations of the annual earnings of radiologists and surgeons are \$31,000 and \$33,000. Construct a 94 % construct interval for the difference between the annual earnings of radiologists and surgeons. $\mu_1 - \mu_2 = 15000 \pm 4184$, $10,816 < \mu_1 - \mu_2 < 19,184$

7. A poll finds that 43% of population approves of the job that the President is doing: The poll has a margin of error 4.5%. Find a 90% confidence interval for the percentage of population that approves President's performance. What was the sample size for this poll? $n = 328$

8. In a random sample of 1600 people from a large city, it is found that 900 support the mayor in the upcoming election. Based on this sample and using 95 % confidence level , would you claim that the mayor will win a majority of the vote? Explain

$$\hat{p} = 56.25\%, \quad E = 2.43 \quad 53.82\% < P < 68.68\%$$

Answer: Both men: $\frac{12}{26} \frac{11}{25} = 20.31\%$ **24.** Both women: $\frac{14}{26} \frac{13}{25} = 28\%$ **25.** One of each: $\frac{12}{26} \frac{14}{25} + \frac{14}{26} \frac{12}{25} = 51.59\%$

Ans: **26.** Both Red: $\frac{10}{22} \frac{10}{22} = 20.66\%$ **27.** Both black: $\frac{12}{22} \frac{12}{22} = 29.75\%$ **28.** One of each: $\frac{10}{22} \frac{12}{22} + \frac{10}{22} \frac{10}{22} = 49.594\%$

Also Review Sample Tests #1, #3, # 4 from class website.