

**INSTRUCTIONS PART II:** Questions 11 – 25.

Choose **TEN** out of the next **FIFTEEN** questions to complete. You must show all your work and clearly indicate your answer for full credit. **CROSS OUT** the problems that you do not want graded.

**Find the mean of the data summarized in the given frequency distribution.**

- 11) The highway speeds of 100 cars are summarized in the frequency distribution below.  
Find the mean speed.

Speed (mph)	Cars
30-39	3
40-49	18
50-59	52
60-69	17
70-79	10

**Find the indicated probability.**

- 12) A study conducted at a certain college shows that 62% of the school's graduates find a job in their chosen field within a year after graduation. Find the probability that among 5 randomly selected graduates, at least one finds a job in his or her chosen field within a year of graduating. Round your answer to the nearest thousandth.

**Test the given claim using the P-value method of hypothesis testing. Identify the null hypothesis, alternative hypothesis, test statistic, P-value, conclusion about the null hypothesis, and final conclusion that addresses the original claim.**

- 13) Various temperature measurements are recorded at different times for a particular city. The mean of  $20^{\circ}\text{C}$  is obtained for 40 temperatures on 40 different days. Assuming that  $\sigma = 1.5^{\circ}\text{C}$ , test the claim that the population mean is  $22^{\circ}\text{C}$ . Use a 0.05 significance level.

**Use the given degree of confidence and sample data to find a confidence interval for the population standard deviation. Assume that the population has a normal distribution.**

- 14) A sociologist develops a test to measure attitudes about public transportation, and 27 randomly selected subjects are given the test. Their mean score is 76.2 and their standard deviation is 21.4. Construct the 95% confidence interval for the standard deviation,  $\sigma$ , of the scores of all subjects. Round your answers to the nearest tenth.

**Provide an appropriate response.**

- 15) The two most frequently used measures of central tendency are the mean and the median. Compare these two measures for the following characteristics: Takes every score into account? Affected by extreme scores? Advantages.

**Find the best predicted value of y corresponding to the given value of x.**

- 16) The regression equation relating dexterity scores ( $x$ ) and productivity scores ( $y$ ) for the employees of a company is  $\hat{y} = 5.50 + 1.91x$ . Ten pairs of data were used to obtain the equation. The same data yield  $r = 0.986$  and  $\bar{y} = 56.3$ . What is the best predicted productivity score for a person whose dexterity score is 20?

**Solve the problem.**

- 17) A final exam in Statistics has a mean of 73 with standard deviation 7.8. If 24 students are randomly selected, find the probability that the mean of their test scores is greater than 71.

**Find the minimum sample size you should use to construct a confidence interval for a population proportion.**

- 18) A researcher wants to estimate the true proportion of college students who use public transportation. She wants to have a confidence level of 95% and a margin of error of 2%. She will also be using information from a previous study that estimates the sample proportion to be 57%. What minimum sample size should she use for her study?

**Find the indicated probability.**

- 19) A community college estimates that 73% of their students continue on to four year universities. In a sample of 25 students from this college, what is the probability that exactly 16 of them will continue on to a four year university? Round your answer to four decimal places.

**Use the given data to construct a frequency distribution.**

- 20) The ages of the students in one section of Math 1040 are given below.

18	20	21	24	25
25	26	27	29	29
30	32	33	35	37
39	40	44	46	50

Construct a frequency table for these ages with five classes beginning with a lower class limit of 18. Be sure to calculate the correct class width.

Age	Frequency

**Solve the problem.**

- 21) Scores on a test are normally distributed with a mean of 68 and a standard deviation of 11.2. A professor wants to conduct a study using the middle 30% of the class. Find the lowest and highest test scores of the students who can take part in the study. Round your answers to the nearest tenth.

**Solve.**

- 22) Find the standard deviation for the given probability distribution. Round to the nearest hundredth.

$x$	$P(x)$
0	0.12
1	0.11
2	0.26
3	0.08
4	0.43

**Find the indicated probability.**

- 23) You are dealt three cards successively (without replacement) from a shuffled deck of 52 playing cards. Find the probability that all three cards are hearts.

**Test the given claim using the traditional method of hypothesis testing. Identify the null hypothesis, alternative hypothesis, the critical value(s), test statistic, conclusion about the null hypothesis, and final conclusion that addresses the original claim.**

- 24) In a clinical study of an allergy drug, 108 of the 202 subjects reported experiencing significant relief from their symptoms. At the 0.01 significance level, test the claim that more than half of all those using the drug experience relief.

**Find the value of the linear correlation coefficient and determine whether there is a linear correlation between the two variables.**

25) The paired data below consist of the temperatures on randomly chosen days and the amount a certain kind of plant grew (in millimeters):

Temp	62	76	50	51	71	46	51	44	79
Growth	36	39	50	13	33	33	17	6	16

Find the linear correlation coefficient and using  $\alpha = 0.01$  determine whether there is a significant linear correlation between the temperatures and the plant growth.

## Answer Key

Testname: STATAFINALSSF07

11) 55.8 mph

12) 0.992

13)  $H_0: \mu = 22$ ;  $H_1: \mu \neq 22$ . Test statistic:  $z = -8.43$ ;

P-value: 0.0002. Because the P-value of 0.0002 is less than the significance level of  $\alpha = 0.05$ , we reject the null hypothesis. There is sufficient evidence to warrant rejection of the claim that the mean temperature is  $22^\circ\text{C}$ .

14)  $16.9 < \sigma < 29.3$

15) Answers will vary.

16) 43.7

17) 0.8962

18) 2354

19) 0.1013

20) class width = 7

Age	Frequency
18 - 24	4
25 - 31	7
32 - 38	4
39 - 45	3
46 - 52	2

21) lowest score = 63.7, highest score = 72.3 (using  $z = \pm 0.38$ )

lowest score = 63.6, highest score = 72.4 (using  $z = \pm 0.39$ )

22) 1.43

23)  $\frac{(13 \cdot 12 \cdot 11)}{(52 \cdot 51 \cdot 50)} = \frac{11}{850} \approx 0.0129$

24)  $H_0: p = 0.5$ .  $H_1: p > 0.5$ . Test statistic:  $z = 0.99$ .

Critical values:  $z = 2.33$ . Fail to reject null hypothesis. There is not sufficient evidence to support the claim that more than half of all those using the drug experience relief.

25)  $r = 0.196$

There is not a linear correlation between the two variables. (Using table A-6,  $r < 0.798$ )