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Question 1 of 23

1.0 Points

The data presented in the table below resulted from an experiment in which seeds of 5 different types were planted and the number of seeds that germinated within 5 weeks after planting was recorded for each seed type. At the .01 level of significance, is the proportion of seeds that germinate dependent on the seed type?

		Observed Frequencies	
		Germinated	Failed to Germinate
Seed Type	1	31	7
	2	57	33
	3	87	60
	4	52	44
	5	10	19

- ☐ A.Yes, because the test value 16.86 is greater than the critical value of 13.28
- ☐ B.Yes, because the test value 16.86 is less than the critical value of 14.86
- ☐ C.No, because the test value 16.86 is greater than the critical value of 13.28
- ☐ D.No, because the test value 13.28 is less than the critical value of 16.86

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Question 2 of 23

1.0 Points

The chi-square goodness-of-fit test can be used to test for:

- ☐ A.normality
- ☐ B.difference between population means
- ☐ C.significance of sample statistics
- ☐ D.difference between population variances

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Part 2 of 16 -

Question 3 of 23

1.0 Points

The city of Oakdale wishes to see if there is a linear relationship between the temperature and the amount of electricity used (in kilowatts). Based on the data in the table below, is there a significant linear relationship between temperature and the amount of electricity used? These data are also available in the worksheet temperature in the Excel workbook Temperature.xlsx.

[Temperature.xlsx](#)

Temperature (x)	73	78	85	98	93	81	76	105
Kilowatts (y)	680	760	910	1510	1170	837	600	1800

- ☐ A.Yes, the sample correlation coefficient is equal to 0.981, which provides evidence of a significant linear relationship.
- ☐ B.Yes, the sample correlation coefficient is equal to 0.878, which provides evidence of a significant linear relationship.
- ☐ C.No, the sample correlation coefficient is equal to 0.981, which does not provide evidence of a significant linear relationship.
- ☐ D.No, the sample correlation coefficient is equal to 0.098, which does not provide evidence of a significant linear relationship.

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Question 4 of 23

1.0 Points

Outliers are observations that

- ☐ A. disrupt the entire linear trend
- ☐ B. lie outside the typical pattern of points
- ☐ C. lie outside the sample
- ☐ D. render the study useless

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Question 5 of 23

1.0 Points

_____ is/are especially helpful in identifying outliers.

- ☐ A. Linear regression
- ☐ B. Scatterplots
- ☐ C. Regression analysis
- ☐ D. Normal curves

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1.0 Points

A field researcher is gathering data on the trunk diameters of mature pine and spruce trees in a certain area. The following are the results of his random sampling. Can he conclude, at the .10 level of significance, that the average trunk diameter of a pine tree is greater than the average diameter of a spruce tree?

	Pine trees	Spruce trees
Sample size	40	70
Mean trunk diameter (cm)	45	39
Sample variance	100	150

- ☐ A. The data support the claim because the test value 2.78 is greater than 1.64.
- ☐ B. The data do not support the claim because the test value 1.29 is greater than 1.28.
- ☐ C. The data support the claim because the test value 2.78 is greater than 1.28.
- ☐ D. The data do not support the claim because the test value 1.29 is less than 1.64.

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Question 7 of 23

1.0 Points

Multiple myeloma or blood plasma cancer is characterized by increased blood vessel formulation in the bone marrow that is a prognostic factor in survival. One treatment approach used for multiple myeloma is stem cell transplantation with the patient's own stem cells. The following data represent the bone marrow microvessel density for a sample of 7 patients who had a complete response to a stem cell transplant as measured by blood and urine tests. Two measurements were taken: the first immediately prior to the stem cell transplant, and the second at the time of the complete response.

Patient	1	2	3	4	5	6	7
Before	158	189	202	353	416	426	441
After	284	214	101	227	290	176	290

Perform an appropriate test of hypothesis to determine if there is evidence, at the .05 level of significance, to support the claim that the mean bone marrow microvessel density is higher before the stem cell transplant than after the stem cell transplant? What is the value of the sample test statistic?

- ☐ A. $t = 1.8424$
- ☐ B. $p = 2.7234$
- ☐ C. $z = 1.8424$
- ☐ D. $t = 2.7234$

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Question 8 of 23

1.0 Points

Results from previous studies showed 79% of all high school seniors from a certain city plan to attend college after graduation. A random sample of 200 high school seniors from this city reveals that 162 plan to attend college. Does this indicate that the percentage has increased from that of previous studies? Test at the 5% level of significance.

Compute the z or t value of the sample test statistic.

- ☐ A. $z = 0.62$
- ☐ B. $t = 1.645$
- ☐ C. $z = 1.96$
- ☐ D. $z = 0.69$

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Question 9 of 23

1.0 Points

Smaller p-values indicate more evidence in support of the:

- ☐ A. quality of the researcher
- ☐ B. null hypothesis
- ☐ C. the reduction of variance
- ☐ D. alternative hypothesis

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Question 10 of 23

1.0 Points

The form of the alternative hypothesis can be:

- ☐ A. two-tailed
- ☐ B. neither one nor two-tailed
- ☐ C. one or two-tailed
- ☐ D. one-tailed

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Part 5 of 16 -

Question 11 of 23

1.0 Points

In a study of elephants a researcher wishes to determine the average weight of a certain subspecies of elephants. From previous studies, the standard deviation of the weights of elephants in this subspecies is known to be 1500 pounds. How many elephants does the researcher need to weigh so that he can be 80% confident that the average weight of elephants in his sample is within 350 pounds of the true average weight for this subspecies?

- ☐ A. 166
- ☐ B. 50
- ☐ C. 31
- ☐ D. 39

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Question 12 of 23

1.0 Points

In constructing a confidence interval estimate for a population mean, when we replace σ with the sample standard deviation (s), we introduce a new source of variability and the sampling distribution we use is:

- ☐ A. chi-square distribution
- ☐ B. F- distribution
- ☐ C. the normal distribution
- ☐ D. t -distribution

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Part 6 of 16 -

Question 13 of 23

1.0 Points

The standard deviation of a probability distribution is a:

- The standard deviation of a probability distribution is a.
- ☐ A.measure of relative likelihood
 - ☐ B.measure of central location
 - ☐ C.measure of skewness of the distribution
 - ☐ D.measure of variability of the distribution

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Part 7 of 16 -

Question 14 of 23

1.0 Points

The following data were obtained from a survey of college students. The variable X represents the number of non-assigned books read during the past six months.

x	0	1	2	3	4	5
$P(X=x)$	0.20	0.25	0.20	0.15	0.10	0.10

What is the standard deviation of X ?

- ☐ A.1.58
- ☐ B.3.24
- ☐ C.2.0
- ☐ D.1.24

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Part 8 of 16 -

Question 15 of 23

1.0 Points

If two events are mutually exclusive, what is the probability that both occur at the same time?

- ☐ A.0.00
- ☐ B.Cannot be determined from the information given.
- ☐ C.0.50
- ☐ D.1.00

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Part 9 of 16 -

Question 16 of 23

3.0 Points

Accepted characters: numbers, decimal point markers (period or comma), sign indicators (-), spaces (e.g., as thousands separator, 5 000), "E" or "e" (used in scientific notation). **NOTE:** For scientific notation, a period **MUST** be used as the decimal point marker.

Complex numbers should be in the form $(a + bi)$ where "a" and "b" need to have explicitly stated values. For example: $\{1+1i\}$ is valid whereas $\{1+i\}$ is not. $\{0+9i\}$ is valid whereas $\{9i\}$ is not.

Staples, a chain of large office supply stores, sells a line of desktop and laptop computers. Company executives want to know whether the demands for these two types of computers are dependent on one another. Each day's demand for each type of computers is categorized as Low, Medium-Low, Medium-High, or High. The data shown in the table below is based on 200 days of operation. Based on these data, can Staples conclude that demands for these two types of computers are independent? Test at the 5% level of significance.

			desktops			
		low	med-low	med-high	high	
	low	3	14	14	4	35
laptops	med-low	6	18	17	22	63
	med-high	13	16	11	16	56
	high	8	14	15	9	46
		30	62	57	51	200

What is the test value for this hypothesis test?

Answer: Round your answer to two decimal places.

What is the critical value for this hypothesis test?

Answer: Round your answer to two decimal places.

What is the conclusion for this hypothesis test? Choose one.

1. At the .05 level of significance, Staples can conclude that demands for these two types of computers are independent.
2. At the .05 level of significance, Staples can conclude that demands for these two types of computers are dependent.

Answer: Enter only a 1 or 2 for your answer.

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Question 17 of 23

1.0 Points

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Complex numbers should be in the form (a + bi) where "a" and "b" need to have explicitly stated values.

For example: {1+1i} is valid whereas {1+i} is not. {0+9i} is valid whereas {9i} is not.

A company has observed that there is a linear relationship between indirect labor expense (ILE) , in dollars, and direct labor hours (DLH). Data for direct labor hours and indirect labor expense for 18 months are given in the file [ILE and DLH.xlsx](#)

Treating ILE as the response variable, use regression to fit a straight line to all 18 data points.

Approximately what percentage of the variation in indirect labor expenses is explained by the regression model you derived?

Place your answer, rounded to 1 decimal place, in the blank. Do not use any stray punctuation marks or a percentage sign. For example, 78.9 would be a legitimate entry.

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Question 18 of 23

1.0 Points

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Complex numbers should be in the form (a + bi) where "a" and "b" need to have explicitly stated values.

For example: {1+1i} is valid whereas {1+i} is not. {0+9i} is valid whereas {9i} is not.

Are America's top chief executive officers (CEOs) really worth all that money? One way to answer this question is to look at the annual company percentage increase in revenue versus the CEO's annual percentage salary increase in that same company. Suppose that a random sample of companies yielded the following data:

percent change for corporation	15	12	3	12	28	6	8	2
percent change for CEO	6	17	-4	12	32	-1	7	2

Do these data indicate that the population mean percentage increase in corporate revenue is greater than the population mean percentage increase in CEO salary? Use a 5% level of significance. What is the p-value associated with this test of hypothesis?

Place your answer, rounded to 3 decimal places, in the blank. For example, 0.134 would be a legitimate entry.

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Question 19 of 23

1.0 Points

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Complex numbers should be in the form (a + bi) where "a" and "b" need to have explicitly stated values.

For example: {1+1i} is valid whereas {1+i} is not. {0+9i} is valid whereas {9i} is not.

A popular retail store knows that the purchase amounts by its customers is a random variable that follows a normal distribution with a mean of \$30 and a standard deviation of \$9

What is the probability that a randomly selected customer will spend between \$20 and \$35 at this store? Place your answer, rounded to 4 decimal places, in the blank. For example, 0.3456 would be a legitimate entry.

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Question 20 of 23

1.0 Points

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Complex numbers should be in the form $(a + bi)$ where "a" and "b" need to have explicitly stated values.

For example: $\{1+1i\}$ is valid whereas $\{1+i\}$ is not. $\{0+9i\}$ is valid whereas $\{9i\}$ is not.

A sample of 40 country CD recordings of Willie Nelson has been examined. The average playing time of these recordings is 51.3 minutes, and the standard deviation is $s = 5.8$ minutes.

Using an appropriate t-multiplier, construct a 95% confidence interval for the mean playing time of all Willie Nelson recordings.

Place your LOWER limit, in minutes, rounded to 2 decimal places, in the first blank. For example, 56.78 would be a legitimate entry. .

Place your UPPER limit, in minutes, rounded to 2 decimal places, in the second blank. For example, 67.89 would be a legitimate entry. .

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Question 21 of 23

1.0 Points

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Complex numbers should be in the form $(a + bi)$ where "a" and "b" need to have explicitly stated values.

For example: $\{1+1i\}$ is valid whereas $\{1+i\}$ is not. $\{0+9i\}$ is valid whereas $\{9i\}$ is not.

In February 2002 the Argentine peso lost 70% of its value compared to the United States dollar. This devaluation drastically raised the price of imported products. According to a survey conducted by AC Nielsen in April 2002, 68% of the consumers in Argentina were buying fewer products than before the devaluation, 24% were buying the same number of products, and 8% were buying more products. Furthermore, in a trend toward purchasing less-expensive brands, 88% indicated that they had changed the brands they purchased. Suppose the following complete set of results were reported. Use the following data to answer this question.

Brands Purchased	Number of Products Purchased			Total
	Fewer	Same	More	
Same	10	14	24	48
Changed	262	82	8	352
Total	272	96	32	400

What is the probability that a consumer selected at random purchased the same number or more products than before? Place your answer, rounded to 4 decimal places, in the blank.

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Question 22 of 23

1.0 Points

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Complex numbers should be in the form $(a + bi)$ where "a" and "b" need to have explicitly stated values.

For example: $\{1+1i\}$ is valid whereas $\{1+i\}$ is not. $\{0+9i\}$ is valid whereas $\{9i\}$ is not.

A survey determines that mint chocolate chip is the favorite ice cream flavor of 6% of consumers. An ice cream shop determines that of 260 customers, 20 customers stated their preference for mint chocolate chip.

Find the P-value that would be used to determine if the percentage of customers who prefer mint chocolate chip ice has increased at a 5% level of significance.

P-value: Round your answer to four decimal places as necessary.

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Question 23 of 23

1.0 Points

Accepted characters: numbers, decimal point markers (period or comma), sign indicators (-), spaces (e.g., as thousands separator, 5 000), "E" or "e" (used in scientific notation). **NOTE:** For scientific notation, a period **MUST** be used as the decimal point marker.

Complex numbers should be in the form $(a + bi)$ where "a" and "b" need to have explicitly stated values.

For example: $\{1+1i\}$ is valid whereas $\{1+i\}$ is not. $\{0+9i\}$ is valid whereas $\{9i\}$ is not.

An ice cream vendor sells three flavors: chocolate, strawberry, and vanilla. Forty five percent of the sales are chocolate, while 30% are strawberry, with the rest vanilla flavored. Sales are by the cone or the cup. The percentages of cones sales for chocolate, strawberry, and vanilla, are 75%, 60%, and 40%, respectively. For a randomly selected sale, define the following events:

A_1 = chocolate chosen

A_2 = strawberry chosen

A_3 = vanilla chosen

B = ice cream on a cone

$\bar{B}$ = ice cream in a cup

Find the probability that the ice cream was sold in a cup. Place your answer, rounded to 4 decimal places, in the blank. For exampe, 0.3456 would be a legitimate entry.



