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| Question 1 of 17 | 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?

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

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

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| Question 2 of 17 | 1.0 Points |

Two independent samples of sizes n1 = 50 and n2 = 50 are randomly selected from two populations to test the difference between the population means,  . The sampling distribution of the sample mean difference,  is:

|  |  |
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| A.approximately normal |  |
| B.chi-squared distributed with 99 degrees of freedom |  |
| C.t - distributed with 98 degrees of freedom |  |
| D.normally distributed |  |

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| Question 3 of 17 | 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 |

At the .01 level of significance, is there sufficient evidence to conclude that the mean bone marrow microvessel density is higher before the stem cell transplant than after the stem cell transplant?

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| --- | --- |
| A.No |  |
| B.Yes |  |
| C.Cannot Determine |  |

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| Question 4 of 17 | 1.0 Points |

In choosing the “best-fitting” line through a set of points in linear regression, we choose the one with the:

|  |  |
| --- | --- |
| A.largest number of points on the line |  |
| B.largest sum of squared residuals |  |
| C.smallest number of outliers |  |
| D.smallest sum of squared residuals |  |

Question 5 of 17

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](https://edge.apus.edu/access/content/group/science-and-technology-common/Math/LenKellyObjects/MATH302%20%20Data%20Files/Temperature.xlsx)

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

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| --- | --- |
| A.No, the sample correlation coefficient is equal to 0.981, which does not provide evidence of a significant linear relationship. |  |
| B.Yes, the sample correlation coefficient is equal to 0.981, which provides evidence of a significant linear relationship. |  |
| C.Yes, the sample correlation coefficient is equal to 0.878, which provides 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 6 of 17 | 1.0 Points |

The marketing manager of a large supermarket chain would like to use shelf space to predict the sales of pet food. For a random sample of 12 similar stores, she gathered the following information regarding the shelf space, in feet, devoted to pet food and the weekly sales in hundreds of dollars.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Store | 1 | 2 | 3 | 4 | 5 | 6 |
| Shelf Space | 5 | 5 | 5 | 10 | 10 | 10 |
| Weekly Sales | 1.6 | 2.2 | 1.4 | 1.9 | 2.4 | 2.6 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Store | 7 | 8 | 9 | 10 | 11 | 12 |
| Shelf Space | 15 | 15 | 15 | 20 | 20 | 20 |
| Weekly Sales | 2.3 | 2.7 | 2.8 | 2.6 | 2.9 | 3.1 |

What is the estimated regression equation?

|  |  |
| --- | --- |
| A. = 2.63 - 0.174x |  |
| B. = 2.63 + 0.724x |  |
| C. = 1.45 + 0.724x  |  |
| D. = 1.45 + 0.074x |  |

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| Question 7 of 17 | 1.0 Points |

The standard error of the estimate, sest, is essentially the

|  |  |
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| A.standard deviation of the residuals |  |
| B.mean of the explanatory variable |  |
| C.standard deviation of the explanatory variable |  |
| D.mean of the residuals |  |

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| Question 8 of 17 | 1.0 Points |

Outliers are observations that

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

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| Question 9 of 17 | 2.0 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. A business major wants to determine whether the variation in advertising costs of hair salons is different from the variation in advertising costs of nail salons.  He surveys several businesses and finds the standard deviation in monthly advertising costs is $23 for 12 hair salons, and $43 for 8 nail salons.What is the test value for this hypothesis test?Test value: Round your answer to two decimal places.At the 0.05 level of significance, what is the critical value?Critical value:   Round your answer to two decimal places. |