P452 - Assignment – 3

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Question-4

Students t-Test

The students t-Test has been done and the results has been tabulated in the table.

|  |  |  |
| --- | --- | --- |
| Calculations for the Significance test | **Focal Length** | |
| **Shipment A** | **Shipment B** |
| 4.65 | 4.75 |
| 4.84 | 4.79 |
| 4.59 | 4.74 |
| 4.75 | 4.74 |
| 4.63 | 4.77 |
| 4.75 | 4.58 |
| 4.58 | 4.81 |
| 4.82 |  |
| 4.86 |  |
| 4.6 |  |
| 4.77 |  |
| 4.65 |  |
| 4.8 |  |
| **Mean** | 4.714615 | 4.740000 |
| **St Dev** | 0.101293 | 0.075277 |
| **Variance** | 0.010260 | 0.005667 |
| **n** | 13.000000 | 7.000000 |
| **t-Value** | **0.634858601** | |
| **t-test prob** | **0.569400** | |
| **F-Value** | **1.810633484** | |
| **Q-Value** | **0.480426** | |

From the table we can see that the obtained probability is 0.5694 and the t-value is 0.6348. And the degree of freedom is .

Now if we consider the A = 0.05, from the t-table we can see that the corresponding value of t from the table for the is 2.101. The table used can be accessed by [clicking here](https://www.sjsu.edu/faculty/gerstman/StatPrimer/t-table.pdf). Since the value of our t is much less than the in the t-table, we can say the Null hypothesis: *There is no significant difference between the 2 data sets* is accepted. Which means that the 2 data are from the same population.

F-Test

From the table we can see that the F-Value of our data is 1.81 and the Q- Value at degree of freedoms 13-1 and 7-1, that is Q(1.81,12,6) is 2.9 obtained from the table from [here](https://statisticsbyjim.com/hypothesis-testing/f-table/). This value of Q is for . So, at this level, the rejection region is . So, we can reject that at 0.1 significance the Null hypothesis that the 2 variances are equal is rejected hence .

Question-3

The Grades have been divided into equal bins of width 1 with grade C at the center. The calculations of the same are shown in the table below. From the table we can see that

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **x-point** | **Grades** | **Unbiased Distribution f(x)** | **Expected Frequency Nf(x)** | **Observed Frequency** |  |
| 2 | **A** | 0.0540 | 32.3946 | 77.0000 | 61.4190 |
| 1 | **B** | 0.2420 | 145.1824 | 150.0000 | 0.1599 |
| 0 | **C** | 0.3989 | 239.3654 | 210.0000 | 3.6025 |
| 1 | **D** | 0.2420 | 145.1824 | 125.0000 | 2.8056 |
| 2 | **E** | 0.0540 | 32.3946 | 38.0000 | 0.9699 |
| **chi Square** | | | | | 68.957017 |

The value was obtained to be 68.95 for 4 degrees of freedom. So, from the -table, the critical value of the is 9.49 @ 5% Level of significance and 7.78 @ 10% Significance. So, the observed is much greater than both of the critical value. So, we have enough evidence to reject the hypothesis and say that the results are biased.