

Examrace

Statistics MCQs – Hypothesis Testing for Two Populations Part 5

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81. The national electricity supplier claims that switching off the hot water cylinder at night does not result in saving of electricity. In order to test this claim a newspaper reporter obtains the co-operation of 16 house owners with similar houses and salaries. Eight of the selected owners switch their cylinders off at night. The consumption of electricity in each house over a period of 30 days is measured; the units are kWh (kilowatt-hours) . For households that switched off their hot water cylinders, average consumption over the 30 days was 680kWh with a variance of 450kWh². For those that did not switch off their hot water cylinders, average electricity consumption was 700kWh with a variance of 350kWh². If we wish to test the assumption of equal population variances at the 5 % level of significance, what is the value of the test statistic?

- a. 1.50
- b. 1.42
- c. 1.29
- d. 1.33
- e. 1.55

Answer: C

82. The national electricity supplier claims that switching off the hot water cylinder at night does not result in saving of electricity. In order to test this claim a newspaper reporter obtains the co-operation of 16 house owners with similar houses and salaries. Eight of the selected owners switch their cylinders off at night. The consumption of electricity in each house over a period of 30 days is measured; the units are kWh (kilowatt-hours) . For households that switched off their hot water cylinders, average consumption over the 30 days was 680kWh with a variance of 400kWh². For those that did not switch off their hot water cylinders, average electricity consumption was 700kWh with a variance of 300kWh². If we wish to test the assumption of equal population variances at the 5 % level of significance, what is the value of the test statistic?

- a. 1.50
- b. 1.42
- c. 1.29

d. 1.33

e. 1.55

Answer: D

83. The national electricity supplier claims that switching off the hot water cylinder at night does not result in saving of electricity. In order to test this claim a newspaper reporter obtains the co-operation of 16 house owners with similar houses and salaries. Eight of the selected owners switch their cylinders off at night. The consumption of electricity in each house over a period of 30 days is measured; the units are kWh (kilowatt-hours) . For households that switched off their hot water cylinders, average consumption over the 30 days was 680kWh with a variance of 450kWh². For those that did not switch off their hot water cylinders, average electricity consumption was 700kWh with a variance of 290kWh². If we wish to test the assumption of equal population variances at the 5 % level of significance, what is the value of the test statistic?

a. 1.50

b. 1.42

c. 1.29

d. 1.33

e. 1.55

Answer: E

84. In a test to determine whether two population variances are equal, the calculated test statistic value equalled 4.12. The numerator degrees of freedom were 2 and the denominator degrees of freedom were 13. The test was one-sided and conducted at the 5 % level of significance. What was the correct conclusion to the test in this case?

a. do not reject the null hypothesis at the 5 % level of significance and conclude that the one variance is significantly larger than the other

b. reject the null hypothesis at the 5 % level of significance and conclude that there is no difference between the two population variances

c. do not reject the null hypothesis at the 5 % level of significance and conclude that there is no difference between the two population variances

d. reject the null hypothesis at the 5 % level of significance and conclude that the one variance is significantly larger than the other

e. there is not enough information presented here to be able to make a conclusion

Answer: D

85. In a test to determine whether two population variances are equal, the calculated test statistic value equalled 3.12. The numerator degrees of freedom were 2 and the denominator degrees of freedom were 13. The test was one-sided and conducted at the 5 % level of significance. What was the correct conclusion to the test in this case?

- a. do not reject the null hypothesis at the 5 % level of significance and conclude that the one variance is significantly larger than the other
- b. reject the null hypothesis at the 5 % level of significance and conclude that there is no difference between the two population variances
- c. do not reject the null hypothesis at the 5 % level of significance and conclude that there is no difference between the two population variances
- d. reject the null hypothesis at the 5 % level of significance and conclude that the one variance is significantly larger than the other
- e. there is not enough information presented here to be able to make a conclusion

Answer: C

86. Two samples are drawn, one each from an independent normally distributed population. The sample size for sample 1 is 16, while the sample variance is 47.3. For sample 2, the sample size is 13, while the sample variance is 36.4. We wish to test whether the population variance of population 1 is greater than the population variance of population 2. What is the value of the test statistic in this case?

- a. 1.30
- b. 1.34
- c. 1.50
- d. 1.41
- e. 1.02

Answer: A

87. Two samples are drawn, one each from an independent normally distributed population. The sample size for sample 1 is 16, while the sample variance is 48.9. For sample 2, the sample size is 13, while the sample variance is 36.4. We wish to test whether the population variance of population 1 is greater than the population variance of population 2. What is the value of the test statistic in this case?

- a. 1.30
- b. 1.34
- c. 1.50
- d. 1.41

e. 1.02

Answer: B

88. Two samples are drawn, one each from an independent normally distributed population. The sample size for sample 1 is 16, while the sample variance is 47.3. For sample 2, the sample size is 13, while the sample variance is 31.6. We wish to test whether the population variance of population 1 is greater than the population variance of population 2. What is the value of the test statistic in this case?

a. 1.30

b. 1.34

c. 1.50

d. 1.41

e. 1.02

Answer: C

89. Two samples are drawn, one each from an independent normally distributed population. The sample size for sample 1 is 16, while the sample variance is 51.2. For sample 2, the sample size is 13, while the sample variance is 36.4. We wish to test whether the population variance of population 1 is greater than the population variance of population 2. What is the value of the test statistic in this case?

a. 1.30

b. 1.34

c. 1.50

d. 1.41

e. 1.02

Answer: D

90. Two samples are drawn, one each from an independent normally distributed population. The sample size for sample 1 is 16, while the sample variance is 47.3. For sample 2, the sample size is 13, while the sample variance is 46.5. We wish to test whether the population variance of population 1 is greater than the population variance of population 2. What is the value of the test statistic in this case?

a. 1.30

b. 1.34

c. 1.50

d. 1.41

e. 1.02

Answer: E

91. Two samples are drawn, one each from an independent normally distributed population. The sample size for sample 1 is 16, while the sample variance is 47.3. For sample 2, the sample size is 13, while the sample variance is 36.4. We wish to test whether the population variance of population 1 is greater than the population variance of population 2. What is the critical value of the test in this case, if we test at the 5 % level of significance?

a. 2.62

b. 3.22

c. 3.07

d. 2.75

e. 4.39

Answer: A

92. Two samples are drawn, one each from an independent normally distributed population. The sample size for sample 1 is 16, while the sample variance is 48.9. For sample 2, the sample size is 9, while the sample variance is 36.4. We wish to test whether the population variance of population 1 is greater than the population variance of population 2. What is the critical value of the test in this case, if we test at the 5 % level of significance?

a. 2.62

b. 3.22

c. 3.07

d. 2.75

e. 4.39

Answer: B

93. Two samples are drawn, one each from an independent normally distributed population. The sample size for sample 1 is 13, while the sample variance is 47.3. For sample 2, the sample size is 10, while the sample variance is 31.6. We wish to test whether the population variance of population 1 is greater than the population variance of population 2. What is the critical value of the test in this case, if we test at the 5 % level of significance?

a. 2.62

b. 3.22

- c. 3.07
- d. 2.75
- e. 4.39

Answer: C

94. Two samples are drawn, one each from an independent normally distributed population. The sample size for sample 1 is 11, while the sample variance is 51.2. For sample 2, the sample size is 13, while the sample variance is 36.4. We wish to test whether the population variance of population 1 is greater than the population variance of population 2. What is the critical value of the test in this case, if we test at the 5 % level of significance?

- a. 2.62
- b. 3.22
- c. 3.07
- d. 2.75
- e. 4.39

Answer: D

95. Two samples are drawn, one each from an independent normally distributed population. The sample size for sample 1 is 6, while the sample variance is 47.3. For sample 2, the sample size is 7, while the sample variance is 46.5. We wish to test whether the population variance of population 1 is greater than the population variance of population 2. What is the critical value of the test in this case, if we test at the 5 % level of significance?

- a. 2.62
- b. 3.22
- c. 3.07
- d. 2.75
- e. 4.39

Answer: E

96. Two samples are drawn, one each from an independent normally distributed population. The sample size for sample 1 is 11, while the sample variance is 51.2. For sample 2, the sample size is 13, while the sample variance is 36.4. We wish to test whether the population variance of population 1 is greater than the population variance of population 2. What would be the conclusion to the test in this case, if we test at the 5 % level of significance?

- a. reject H_0 in favour of H_1 and conclude that the variance of population 1 is greater than that of population 2
- b. do not reject H_0 in favour of H_1 and conclude that the variance of population 1 is not greater than that of population 2
- c. reject H_0 in favour of H_1 and conclude that the variance of population 1 is not greater than that of population 2
- d. do not reject H_0 in favour of H_1 and conclude that the variance of population 1 is greater than that of population 2
- e. none of the above

Answer: B

97. Two samples are drawn, one each from an independent normally distributed population. The sample size for sample 1 is 6, while the sample variance is 47.3. For sample 2, the sample size is 7, while the sample variance is 46.5. We wish to test whether the population variance of population 1 is greater than the population variance of population 2. What would be the conclusion to the test in this case, if we test at the 5 % level of significance?

- a. reject H_0 in favour of H_1 and conclude that the variance of population 1 is greater than that of population 2
- b. do not reject H_0 in favour of H_1 and conclude that the variance of population 1 is not greater than that of population 2
- c. reject H_0 in favour of H_1 and conclude that the variance of population 1 is not greater than that of population 2
- d. do not reject H_0 in favour of H_1 and conclude that the variance of population 1 is greater than that of population 2
- e. none of the above

Answer: B

98. We have two machines that fill milk bottles. We accept that both machines are putting, on average, one litre of milk into each bottle. We suspect, however, that the first machine is considerably less consistent than the second, and that the volume of milk it delivers is more variable. We take a random sample of 16 bottles from the first machine and 25 bottles from the second machine and compute sample variances of 5.9ml^2 and 2.1ml^2 respectively. We wish to test whether our suspicions are correct at the 5 % significance level. What is the correct conclusion that can be made at the 5 % significance level in this case?

- a. reject the null hypothesis and conclude that machine 1 is less consistent than machine 2

- b. do not reject the null hypothesis and conclude that there is no difference in consistency between the two machines
- c. reject the null hypothesis and conclude that machine 2 is less consistent than machine 1
- d. do not reject the null hypothesis and conclude that machine 2 is less consistent than machine 1
- e. reject the null hypothesis and conclude that there is no difference in consistency between the two machines

Answer: A

99. We have two machines that fill milk bottles. We accept that both machines are putting, on average, one litre of milk into each bottle. We suspect, however, that the first machine is considerably less consistent than the second, and that the volume of milk it delivers is more variable. We take a random sample of 16 bottles from the first machine and 25 bottles from the second machine and compute sample variances of 3.2ml^2 and 2.1ml^2 respectively. We wish to test whether our suspicions are correct at the 5 % significance level. What is the correct conclusion that can be made at the 5 % significance level in this case?

- a. reject the null hypothesis and conclude that machine 1 is less consistent than machine 2
- b. do not reject the null hypothesis and conclude that there is no difference in consistency between the two machines
- c. reject the null hypothesis and conclude that machine 2 is less consistent than machine 1
- d. do not reject the null hypothesis and conclude that machine 2 is less consistent than machine 1
- e. reject the null hypothesis and conclude that there is no difference in consistency between the two machines

Answer: B

100. We have two machines that fill milk bottles. We accept that both machines are putting, on average, one litre of milk into each bottle. We suspect, however, that the first machine is considerably less consistent than the second, and that the volume of milk it delivers is more variable. We take a random sample of 16 bottles from the first machine and 25 bottles from the second machine and compute sample variances of 4.8ml^2 and 2.1ml^2 respectively. We wish to test whether our suspicions are correct at the 5 % significance level. What is the correct conclusion that can be made at the 5 % significance level in this case?

- a. reject the null hypothesis and conclude that machine 1 is less consistent than machine 2
- b. do not reject the null hypothesis and conclude that there is no difference in consistency between the two machines

- c. reject the null hypothesis and conclude that machine 2 is less consistent than machine 1
- d. do not reject the null hypothesis and conclude that machine 2 is less consistent than machine 1
- e. reject the null hypothesis and conclude that there is no difference in consistency between the two machines

Answer: A

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