

Statistics MCQs – Hypothesis testing for Two populations Part 4

61. A new Grade 9 maths curriculum is to be tested. A number of students in a Grade 9 maths course at a particular high school were randomly divided into two groups. The experimental group received teaching according to the new curriculum while the control group did not. All the students were given a test of computational skill (out of a total of 5 points) after the course and the results were as follows: for the experimental group, the sample size was 28, the sample mean was 1.19 and the sample variance was 74. For the control group, the sample size was 31, the sample mean was 2.99 and the sample variance was 75. We wish to test at the 5% level of significance whether there is any difference in the mean test scores. We assume that the underlying population variances are equal. What is the value of the pooled variance for this test?

- a. 77.16
- b. 72.42
- c. 74.53
- d. 82.37
- e. 78.21

Answer: C

62. A new Grade 9 maths curriculum is to be tested. A number of students in a Grade 9 maths course at a particular high school were randomly divided into two groups. The experimental group received teaching according to the new curriculum while the control group did not. All the students were given a test of computational skill (out of a total of 5 points) after the course and the results were as follows: for the experimental group, the sample size was 28, the sample mean was 1.99 and the sample variance was 85. For the control group, the sample size was 31, the sample mean was 3.54 and the sample variance was 80. We wish to test at the 5% level of significance whether there is any difference in the mean test scores. We assume that the underlying population variances are equal. What is the value of the pooled variance for this test?

- a. 77.16
- b. 72.42
- c. 74.53
- d. 82.37

e. 78.21

Answer: D

63. A new Grade 9 maths curriculum is to be tested. A number of students in a Grade 9 maths course at a particular high school were randomly divided into two groups. The experimental group received teaching according to the new curriculum while the control group did not. All the students were given a test of computational skill (out of a total of 5 points) after the course and the results were as follows: for the experimental group, the sample size was 28, the sample mean was 1.19 and the sample variance was 74. For the control group, the sample size was 31, the sample mean was 0.89 and the sample variance was 82. We wish to test at the 5% level of significance whether there is any difference in the mean test scores. We assume that the underlying population variances are equal. What is the value of the pooled variance for this test?

a. 77.16

b. 72.42

c. 74.53

d. 82.37

e. 78.21

Answer: E

64. 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 300kWh². If we assume that the underlying population variances are not equal and we wish to test whether the mean electricity consumption for those households that turned off their hot water cylinders was lower than for those that did not, what would be the value of the appropriate test statistic?

a. -2.07

b. -1.55

c. -1.03

d. -2.58

e. -0.52

Answer: A

65. 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 685kWh 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 300kWh². If we assume that the underlying population variances are not equal and we wish to test whether the mean electricity consumption for those households that turned off their hot water cylinders was lower than for those that did not, what would be the value of the appropriate test statistic?

- a. -2.07
- b. -1.55
- c. -1.03
- d. -2.58
- e. -0.52

Answer: B

66. 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 690kWh 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 300kWh². If we assume that the underlying population variances are not equal and we wish to test whether the mean electricity consumption for those households that turned off their hot water cylinders was lower than for those that did not, what would be the value of the appropriate test statistic?

- a. -2.07
- b. -1.55
- c. -1.03
- d. -2.58
- e. -0.52

Answer: C

67. 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 705kWh with a variance of 300kWh². If we assume that the underlying population variances are not equal and we wish to test whether the mean electricity consumption for those households that turned off their hot water cylinders was lower than for those that did not, what would be the value of the appropriate test statistic?

- a. -2.07
- b. -1.55
- c. -1.03
- d. -2.58
- e. -0.52

Answer: D

68. 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 695kWh 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 300kWh². If we assume that the underlying population variances are not equal and we wish to test whether the mean electricity consumption for those households that turned off their hot water cylinders was lower than for those that did not, what would be the value of the appropriate test statistic?

- a. -2.07
- b. -1.55
- c. -1.03
- d. -2.58
- e. -0.52

Answer: E

69. A comparison of the price-earnings (P/E) ratio for the top and bottom 100 companies on the JSE is being prepared. A financial advisor randomly sampled each group to determine whether there is any difference in P/E ratios of the two groups of companies. Assume unequal population variances but that the populations are normally distributed. For 6 top 100 companies the average P/E ratio was 18.83 with a sample variance of 128.17. For 8 bottom 100 companies the average P/E ratio was 10.67 with a sample variance of 125.15. The test is conducted at the 5% level of significance. What would be the value of the test statistic for the hypothesis test in this case?

- a. 1.34
- b. 0.74
- c. 1.67
- d. 1.70
- e. 2.25

Answer: A

70. A comparison of the price-earnings (P/E) ratio for the top and bottom 100 companies on the JSE is being prepared. A financial advisor randomly sampled each group to determine whether there is any difference in P/E ratios of the two groups of companies. Assume unequal population variances but that the populations are normally distributed. For 6 top 100 companies the average P/E ratio was 15.15 with a sample variance of 128.17. For 8 bottom 100 companies the average P/E ratio was 10.67 with a sample variance of 125.15. The test is conducted at the 5% level of significance. What would be the value of the test statistic for the hypothesis test in this case?

- a. 1.34
- b. 0.74
- c. 1.67
- d. 1.70
- e. 2.25

Answer: B

71. A comparison of the price-earnings (P/E) ratio for the top and bottom 100 companies on the JSE is being prepared. A financial advisor randomly sampled each group to determine whether there is any difference in P/E ratios of the two groups of companies. Assume unequal population variances but that the populations are normally distributed. For 6 top 100 companies the average P/E ratio was 18.83 with a sample variance of 128.17. For 8 bottom 100 companies the average P/E ratio was 8.67 with a sample variance of 125.15. The test is

conducted at the 5% level of significance. What would be the value of the test statistic for the hypothesis test in this case?

- a. 1.34
- b. 0.74
- c. 1.67
- d. 1.70
- e. 2.25

Answer: C

72. A comparison of the price-earnings (P/E) ratio for the top and bottom 100 companies on the JSE is being prepared. A financial advisor randomly sampled each group to determine whether there is any difference in P/E ratios of the two groups of companies. Assume unequal population variances but that the populations are normally distributed. For 6 top 100 companies the average P/E ratio was 21.03 with a sample variance of 128.17. For 8 bottom 100 companies the average P/E ratio was 10.67 with a sample variance of 125.15. The test is conducted at the 5% level of significance. What would be the value of the test statistic for the hypothesis test in this case?

- a. 1.34
- b. 0.74
- c. 1.67
- d. 1.70
- e. 2.25

Answer: D

73. A comparison of the price-earnings (P/E) ratio for the top and bottom 100 companies on the JSE is being prepared. A financial advisor randomly sampled each group to determine whether there is any difference in P/E ratios of the two groups of companies. Assume unequal population variances but that the populations are normally distributed. For 6 top 100 companies the average P/E ratio was 18.83 with a sample variance of 128.17. For 8 bottom 100 companies the average P/E ratio was 5.14 with a sample variance of 125.15. The test is conducted at the 5% level of significance. What would be the value of the test statistic for the hypothesis test in this case?

- a. 1.34
- b. 0.74
- c. 1.67

d. 1.70

e. 2.25

Answer: E

74. A sociologist wants to test if there is any difference between the mean income of farm workers in two different areas. In area A a random sample of 41 workers yielded a mean income of R15561 with a standard deviation of R9010. In area B a random sample of 9 workers yielded a mean income of R15078 and a standard deviation of R5624. If we assume that the population variances are not equal, what would be the value of the test statistic for the hypothesis test in this case?

a. 0.21

b. 1.25

c. 0.67

d. 2.53

e. 1.95

Answer: A

75. A sociologist wants to test if there is any difference between the mean income of farm workers in two different areas. In area A a random sample of 41 workers yielded a mean income of R18000 with a standard deviation of R9010. In area B a random sample of 9 workers yielded a mean income of R15078 and a standard deviation of R5624. If we assume that the population variances are not equal, what would be the value of the test statistic for the hypothesis test in this case?

a. 0.21

b. 1.25

c. 0.67

d. 2.53

e. 1.95

Answer: B

76. A sociologist wants to test if there is any difference between the mean income of farm workers in two different areas. In area A a random sample of 41 workers yielded a mean income of R15561 with a standard deviation of R9010. In area B a random sample of 9 workers yielded a mean income of R14000 and a standard deviation of R5624. If we assume that the population variances are not equal, what would be the value of the test statistic for the hypothesis test in this case?

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- a. 0.21
- b. 1.25
- c. 0.67
- d. 2.53
- e. 1.95

Answer: C

77. A sociologist wants to test if there is any difference between the mean income of farm workers in two different areas. In area A a random sample of 41 workers yielded a mean income of R21000 with a standard deviation of R9010. In area B a random sample of 9 workers yielded a mean income of R15078 and a standard deviation of R5624. If we assume that the population variances are not equal, what would be the value of the test statistic for the hypothesis test in this case?

- a. 0.21
- b. 1.25
- c. 0.67
- d. 2.53
- e. 1.95

Answer: D

78. A sociologist wants to test if there is any difference between the mean income of farm workers in two different areas. In area A a random sample of 41 workers yielded a mean income of R15561 with a standard deviation of R9010. In area B a random sample of 9 workers yielded a mean income of R11000 and a standard deviation of R5624. If we assume that the population variances are not equal, what would be the value of the test statistic for the hypothesis test in this case?

- a. 0.21
- b. 1.25
- c. 0.67
- d. 2.53
- e. 1.95

Answer: E

79. 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 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: A

80. 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 425kWh². 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: B