Statistics MCQs – Tests for Qualitative Data Part 3

41. A manufacturer of toothpaste wishes to do a market survey on four new flavours of toothpaste to determine whether customers have a specific preference for one flavour or whether all flavours are equally well liked by customers. The four new flavours are: lemon, strawberry, peppermint and orange. 200 customers are each given a sample of all of the new flavours and are asked to state their favourite flavour. 39 customers state that they prefer the lemon flavour, 67 the strawberry flavour, 39 the peppermint flavour and 55 the orange flavour. The test statistic value for the hypothesis test in this case is 11.1. Which of the following is the most correct conclusion for the test?

a. the null hypothesis can be rejected at the 5 % level of significance and we can conclude that preferences for the new toothpaste flavours differ

b. the null hypothesis cannot be rejected at the 5 % level of significance and we can conclude that preferences for the new toothpaste flavours differ

c. the null hypothesis can be rejected at the 2.5 % level of significance and we can conclude that preferences for the new toothpaste flavours differ

d. the null hypothesis can be rejected at the 10 % level of significance and we can conclude that preferences for the new toothpaste flavours differ

e. the null hypothesis can be rejected at the 1 % level of significance and we can conclude that preferences for the new toothpaste flavours differ

Answer: C

42. A manufacturer of toothpaste wishes to do a market survey on four new flavours of toothpaste to determine whether customers have a specific preference for one flavour or whether all flavours are equally well liked by customers. The four new flavours are: lemon, strawberry, peppermint and orange. 200 customers are each given a sample of all of the new flavours and are asked to state their favourite flavour. 45 customers state that they prefer the lemon flavour, 48 the strawberry flavour, 39 the peppermint flavour and 68 the orange flavour. The test statistic value for the hypothesis test in this case is 9.48. Which of the following is the most correct conclusion for the test?

a. the null hypothesis can be rejected at the 5 % level of significance and we can conclude that preferences for the new toothpaste flavours differ

b. the null hypothesis cannot be rejected at the 5 % level of significance and we can conclude that preferences for the new toothpaste flavours differ

c. the null hypothesis can be rejected at the 2.5 % level of significance and we can conclude that preferences for the new toothpaste flavours differ

d. the null hypothesis can be rejected at the 10 % level of significance and we can conclude that preferences for the new toothpaste flavours differ

e. the null hypothesis can be rejected at the 1 % level of significance and we can conclude that preferences for the new toothpaste flavours differ

Answer: C

43. According to a manufacturer of N&N sweets, the distribution of colours of N&N's in a typical bag of sweets is as follows: 20 % blue, 20 % brown, 20 % yellow, 20 % red, 10 % green and 10 % orange. To test this claim we bought a bag of N&N's on campus and counted the number of sweets that fell into each of the different colour categories. We then conducted a chi-squared goodness-of-fit test and found the test statistic value to be 10.57. What is the approximate p-value for this test?

a. $0.05 < \text{p-value} < 0.1$

b. $0.025 < \text{p-value} < 0.05$

c. $0.01 < \text{p-value} < 0.025$

d. $0.005 < \text{p-value} < 0.01$

e. $\text{p-value} < 0.005$

Answer: A

44. According to a manufacturer of N&N sweets, the distribution of colours of N&N's in a typical bag of sweets is as follows: 20 % blue, 20 % brown, 20 % yellow, 20 % red, 10 % green and 10 % orange. To test this claim we bought a bag of N&N's on campus and counted the number of sweets that fell into each of the different colour categories. We then conducted a chi-squared goodness-of-fit test and found the test statistic value to be 11.81. What is the approximate p-value for this test?

a. $0.05 < \text{p-value} < 0.1$

b. $0.025 < \text{p-value} < 0.05$

c. $0.01 < \text{p-value} < 0.025$

d. $0.005 < \text{p-value} < 0.01$

e. $\text{p-value} < 0.005$

Answer: B

45. According to a manufacturer of N&N sweets, the distribution of colours of N&N's in a typical bag of sweets is as follows: 20 % blue, 20 % brown, 20 % yellow, 20 % red, 10 % green and 10 % orange. To test this claim we bought a bag of N&N's on campus and counted the number of sweets that fell into each of the different colour categories. We then conducted a chi-squared goodness-of-fit test and found the test statistic value to be 13.62. What is the approximate p-value for this test?

a. 0.05 < p-value < 0.1

b. 0.025 < p-value < 0.05

c. 0.01 < p-value < 0.025

d. 0.005 < p-value < 0.01

e. p-value < 0.005

Answer: C

46. According to a manufacturer of N&N sweets, the distribution of colours of N&N's in a typical bag of sweets is as follows: 20 % blue, 20 % brown, 20 % yellow, 20 % red, 10 % green and 10 % orange. To test this claim we bought a bag of N&N's on campus and counted the number of sweets that fell into each of the different colour categories. We then conducted a chi-squared goodness-of-fit test and found the test statistic value to be 15.98. What is the approximate p-value for this test?

a. 0.05 < p-value < 0.1

b. 0.025 < p-value < 0.05

c. 0.01 < p-value < 0.025

d. 0.005 < p-value < 0.01

e. p-value < 0.005

Answer: D

47. According to a manufacturer of N&N sweets, the distribution of colours of N&N's in a typical bag of sweets is as follows: 20 % blue, 20 % brown, 20 % yellow, 20 % red, 10 % green and 10 % orange. To test this claim we bought a bag of N&N's on campus and counted the number of sweets that fell into each of the different colour categories. We then conducted a chi-squared goodness-of-fit test and found the test statistic value to be 18.03. What is the approximate p-value for this test?

a. 0.05 < p-value < 0.1

b. 0.025 < p-value < 0.05

c. 0.01 < p-value < 0.025

d. 0.005 < p-value < 0.01

e. p-value < 0.005

Answer: E

48. According to data from a previous census, the South African population is made up of 79 % African people, 10 % Coloured people, 3 % Indian people and 8 % White people. We wish to test whether race data from the most recent census conforms to this pattern. The census records of 150 people are examined are the number of African, Coloured, Indian and White people recorded. The test statistic value for the goodness-of-fit test is 4.1. What is the correct conclusion for this test at the 5 % level of significance?

a. 4.1 is less than the critical value of 5.99 from the tables therefore we do not reject H_0 and conclude that the race distributions remain unchanged

b. 4.1 is less than the critical value of 7.81 from the tables therefore we do not reject H_0 and conclude that the race distributions remain unchanged

c. 4.1 is less than the critical value of 9.49 from the tables therefore we do not reject H_0 and conclude that the race distributions remain unchanged

d. 4.1 is less than the critical value of 5.99 from the tables therefore we reject H_0 and conclude that the race distributions have changed

e. 4.1 is less than the critical value of 7.81 from the tables therefore we reject H_0 and conclude that the race distributions have changed

Answer: B

49. According to data from a previous census, the South African population is made up of 79 % African people, 10 % Coloured people, 3 % Indian people and 8 % White people. We wish to test whether race data from the most recent census conforms to this pattern. The census records of 150 people are examined are the number of African, Coloured, Indian and White people recorded. The test statistic value for the goodness-of-fit test is 10.7. What is the correct conclusion for this test at the 5 % level of significance?

a. 10.7 is more than the critical value of 5.99 from the tables therefore we do not reject H_0 and conclude that the race distributions remain unchanged

b. 10.7 is more than the critical value of 7.81 from the tables therefore we do not reject H_0 and conclude that the race distributions remain unchanged

c. 10.7 is more than the critical value of 9.49 from the tables therefore we do not reject H_0 and conclude that the race distributions remain unchanged

d. 10.7 is more than the critical value of 5.99 from the tables therefore we reject H_0 and conclude that the race distributions have changed

e. 10.7 is more than the critical value of 7.81 from the tables therefore we reject H_0 and conclude that the race distributions have changed

Answer: E

50. We roll a dice 300 times and record the number of ones, twos, threes, fours, fives and sixes that appear. We wish to determine whether the dice is fair (unbiased) by conducting a goodness-of-fit test at the 5 % level of significance. The test statistic value is 10.04. What conclusion can we make?

a. we do not reject H_0 and therefore say that the dice is not fair

b. we do not reject H_0 and therefore say that the dice is fair

c. we reject H_0 and therefore say that the dice is not fair

d. we reject H_0 and therefore say that the dice is fair

e. there is not enough information to make an informed decision in this case

Answer: B

51. We roll a dice 300 times and record the number of ones, twos, threes, fours, fives and sixes that appear. We wish to determine whether the dice is fair (unbiased) by conducting a goodness-of-fit test at the 5 % level of significance. The test statistic value is 12.04. What conclusion can we make?

a. we do not reject H_0 and therefore say that the dice is not fair

b. we do not reject H_0 and therefore say that the dice is fair

c. we reject H_0 and therefore say that the dice is not fair

d. we reject H_0 and therefore say that the dice is fair

e. there is not enough information to make an informed decision in this case

Answer: C

52. We wish to examine the relationship between gender and belief in love at first sight. 45 males and 60 females are asked whether they believe in love at first sight. The only possible answers to the question posed are “yes” or “no” . 20 males and 46 females answer yes. What is the value of the test statistic for the appropriate hypothesis test to be conducted in this case?

a. 11.40

b. 1.99

c. 19.80

d. 5.19

e. 8.69

Answer: A

53. We wish to examine the relationship between gender and belief in love at first sight. 45 males and 60 females are asked whether they believe in love at first sight. The only possible answers to the question posed are “yes” or “no” . 20 males and 35 females answer yes. What is the value of the test statistic for the appropriate hypothesis test to be conducted in this case?

a. 11.40

b. 1.99

c. 19.80

d. 5.19

e. 8.69

Answer: B

54. We wish to examine the relationship between gender and belief in love at first sight. 45 males and 60 females are asked whether they believe in love at first sight. The only possible answers to the question posed are “yes” or “no” . 15 males and 46 females answer yes. What is the value of the test statistic for the appropriate hypothesis test to be conducted in this case?

a. 11.40

b. 1.99

c. 19.80

d. 5.19

e. 8.69

Answer: C

55. We wish to examine the relationship between gender and belief in love at first sight. 45 males and 60 females are asked whether they believe in love at first sight. The only possible answers to the question posed are “yes” or “no” . 20 males and 40 females answer yes. What is the value of the test statistic for the appropriate hypothesis test to be conducted in this case?

a. 11.40

b. 1.99

c. 19.80

d. 5.19

e. 8.69

Answer: D

56. We wish to examine the relationship between gender and belief in love at first sight. 45 males and 60 females are asked whether they believe in love at first sight. The only possible answers to the question posed are “yes” or “no” . 22 males and 46 females answer yes. What is the value of the test statistic for the appropriate hypothesis test to be conducted in this case?

a. 11.40

b. 1.99

c. 19.80

d. 5.19

e. 8.69

Answer: E

57. A test of association using a contingency table is conducted in order to test whether there is a relationship between whether a cycling helmet is worn by a cyclist involved in an accident and the extent of his or her injuries, being either minor injuries, major injuries or death. The accident reports from 155 accidents are examined, 45 involving minor injuries to the cyclist, 62 involving major injuries and 48 involving the death of the cyclist. In each case the number of accidents in which a helmet was worn and in which a helmet was not worn is recorded. In 26 of the accidents involving minor injuries, a helmet was not worn. The number of cases of a cyclist not wearing a helmet where the accident involved major injuries is 42 and in the case of death, 31 times a helmet was not worn by the cyclist. What is the test statistic value of the appropriate test in this case?

a. 1.1

b. 4.9

c. 14.3

d. 7.36

e. 25.1

Answer: A

58. A test of association using a contingency table is conducted in order to test whether there is a relationship between whether a cycling helmet is worn by a cyclist involved in an accident and the extent of his or her injuries, being either minor injuries, major injuries or death. The accident reports from 155 accidents are examined, 45 involving minor injuries to the cyclist, 62 involving major injuries and 48 involving the death of

the cyclist. In each case the number of accidents in which a helmet was worn and in which a helmet was not worn is recorded. In 26 of the accidents involving minor injuries, a helmet was not worn. The number of cases of a cyclist not wearing a helmet where the accident involved major injuries is 48 and in the case of death, 31 times a helmet was not worn by the cyclist. What is the test statistic value of the appropriate test in this case?

a. 1.1

b. 4.9

c. 14.3

d. 7.36

e. 25.1

Answer: B

59. A test of association using a contingency table is conducted in order to test whether there is a relationship between whether a cycling helmet is worn by a cyclist involved in an accident and the extent of his or her injuries, being either minor injuries, major injuries or death. The accident reports from 155 accidents are examined, 45 involving minor injuries to the cyclist, 62 involving major injuries and 48 involving the death of the cyclist. In each case the number of accidents in which a helmet was worn and in which a helmet was not worn is recorded. In 15 of the accidents involving minor injuries, a helmet was not worn. The number of cases of a cyclist not wearing a helmet where the accident involved major injuries is 42 and in the case of death, 31 times a helmet was not worn by the cyclist. What is the test statistic value of the appropriate test in this case?

a. 1.1

b. 4.9

c. 14.3

d. 7.36

e. 25.1

Answer: C

60. A test of association using a contingency table is conducted in order to test whether there is a relationship between whether a cycling helmet is worn by a cyclist involved in an accident and the extent of his or her injuries, being either minor injuries, major injuries or death. The accident reports from 155 accidents are examined, 45 involving minor injuries to the cyclist, 62 involving major injuries and 48 involving the death of the cyclist. In each case the number of accidents in which a helmet was worn and in which a helmet was not worn is recorded. In 26 of the accidents involving minor

injuries, a helmet was not worn. The number of cases of a cyclist not wearing a helmet where the accident involved major injuries is 42 and in the case of death, 40 times a helmet was not worn by the cyclist. What is the test statistic value of the appropriate test in this case?

a. 1.1

b. 4.9

c. 14.3

d. 7.36

e. 25.1

Answer: D

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