Classroom Voting Questions: Statistics

Tests of Significance

1. Child and Protective Services, a branch of the Department of Health and Human Services is investigating the monthly average number of children in foster care over the last several years. They are interested in seeing if the average is dropping from 235 children per month in 2001.

   The null hypothesis for this problem would be:

   (a) $H_0 : \mu < 235$

   (b) $H_0 = 235$

   (c) $H_0 : p = 235$

   (d) $H_0 : \mu = 235$

   (e) None of the above

   Answer: (d).

   by Jack Oberweiser

   STT.06.02.030

   CC HZ MA207 F09: 23/6/12/**59**/0 time 2:30
   CC KC MA207 F09: 21/4/0/**75**/0 time 2:00
   AS DH MA3321 Su12: 0/0/0/**100**/0 time 1:00
   AS DH MA1333 010 F12: 18/9/0/**73**/0 time 1:30
   AS DH MA1333 020 F12: 0/7/0/**93**/0 time 1:30
   AS DH 1333 010 S13: 44/0/0/**50**/6 time 2:10
   AS DH 1333 020 S14: 4/0/4/**92**/0 time 2:00 ,
   AS DH 3321 010 S14: 5/16/0/**79**/0 time 1:30 ,
   AS DH 1333 010 F14: 10/3/0/**86**/0 time 1:30 ,
   AS DH 1333 020 F15: 4/8/0/**83**/4 time 1:40 ,
   CC KC MA207 F15: 0/0/0/**100**/0
   CC KC MA315 F15: 7/0/0/**79**/14 time 1:15
   CC KC MA207 F16: 0/13/0/**87**/0
   AS DH 1342 010 F17: 0/0/0/**97**/3 time 1:30
   CC KC MA207 F18: 18/23/45/**14**/0
   AS DH 1342 020 F18: 3/3/0/**94**/0 time 1:50
   CC KC MA207 S19: 0/17/46/**38**/0
   CC KC MA315 S19: 10/14/19/**43**/14
   AS DH 1342 040 S19: 0/0/0/**100**/0 time 1:40

2. Which of the following pairs gives a legitimate null and alternative hypothesis for carrying out a hypothesis test?

   (a) $H_0 : \pi = 0.4 \quad H_a : \pi > 0.6$

   (b) $H_0 : \mu < 80 \quad H_a : \mu > 80$

   (c) $H_0 : \mu = 80 \quad H_a : \mu < 80$

   (d) $H_0 : \bar{x} = 25 \quad H_a : \bar{x} > 25$

   Answer: (c).

   by Roxy Peck for the textbooks: Roxy Peck and Jay Devore, Statistics: The Exploration and Analysis of Data, 6th Edition, Brooks/Cole Cengage Learning 2008 and Roxy Peck, Chris Olsen and Jay Devore, Introduction to Statistics and Data Analysis, 3rd Edition, Brooks/Cole Cengage Learning 2008.

   STT.06.02.040

   CC HZ MA207 F09: 0/0/**100**/0 time 0:30
   CC KC MA207 F09: 0/0/**100**/0 time 1:00
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   AS DH 1333 010 S13: 0/5/**95**/0 time 1:40
   AS DH 1333 020 S14: 0/0/**100**/0 time 1:00 ,
   AS DH 1333 010 F14: 0/0/**100**/0 time 1:00 ,
   AS DH 3321 010 F14: 0/0/**100**/0 time 2:30 ,
   AS DH 1333 020 F15: 0/0/**100**/0 time 1:00 ,
   CC KC MA207 F15: 0/0/**100**/0 time 1:45
   CC KC MA315 F15: 0/0/**100**/0
   AS DH 1342 010 F17: 0/0/**100**/0 time 0:50
   CC KC MA207 F18: 0/0/**100**/0
   AS DH 1342 020 F18: 0/0/**100**/0 time 1:00
   AS DH 1342 040 S19: 0/0/**100**/0 time 1:00
   AS DH 1342 030 F19: 0/0/**100**/0 time 1:30

3. A grocery store manager is interested in determining if the proportion of customers who pay by credit card at his store is greater than the reported national figure of 0.10. What hypotheses should the store manager test?

   (a) $H_0 : \mu > 0.1 \quad H_a : \mu = 0.1$

   (b) $H_0 : \mu = 0.1 \quad H_a : \mu > 0.1$

   (c) $H_0 : \pi = 0.1 \quad H_a : \pi > 0.1$

   (d) $H_0 : \pi > 0.1 \quad H_a : \pi = 0.1$

(e) $H_0 : \pi > 0.1 \quad H_a : \pi < 0.1$

Answer: (c).

by Roxy Peck for the textbooks: Roxy Peck and Jay Devore, Statistics: The Exploration and Analysis of Data, 6th Edition, Brooks/Cole Cengage Learning 2008 and Roxy Peck, Chris Olsen and Jay Devore, Introduction to Statistics and Data Analysis, 3rd Edition, Brooks/Cole Cengage Learning 2008.

STT.06.02.050

CC KC MA207 F09: 8/92/**0**/0/0 time 2:00
AS DH MA3321 Su12: 0/45/**55**/0/0 time 1:00
AS DH 1333 010 S13: 0/6/**94**/0/0 time 2:00
AS DH 1333 020 S14: 3/97/**0**/0/0 time 1:40 ,
AS DH 1333 010 F14: 0/74/**23**/3/0 time 1:40 ,
AS DH 1333 020 F15: 6/50/**44**/0/0 time 2:00 ,
CC KC MA207 F15: 0/0/**100**/0/0 time 1:00
CC KC MA315 F15: 0/53/**47**/0/0 time 0:45
AS DH 1342 010 F17: 0/8/**92**/0/0 time 1:40
CC KC MA207 F18: 0/55/**36**/9/0
AS DH 1342 020 F18: 0/15/**85**/0/0 time 2:00
AS DH 1342 040 S19: 0/0/**100**/0/0 time 2:00
AS DH 1342 030 F19: 0/16/**84**/0/0 time 2:10

4. A drug company believes their newest drug for controlling cardiac arrhythmias is more effective and has less side effects than the current drug being used in the market. They submit their new drug to the FDA for a clinical trial to assess the efficacy of their drug in comparison to the current drug. What is the most appropriate null hypothesis for this clinical trial?

   (a) H_0: Efficacy of new drug = Efficacy of old drug

   (b) H_0: Efficacy of new drug > Efficacy of old drug

   (c) H_0: Efficacy of new drug < Efficacy of old drug

   (d) H_0: Efficacy of new drug ≠ Efficacy of old drug

   (e) None of the above

Answer: (a). (A)* correct The two-tailed test allows one to examine both a greater than and less than hypothesis without loss to alpha control.

(B), (C), (D) The null hypotheses must include = to specify the point value being hypothesized.

(E) Answer (A) is correct.

by Murphy, McKnight, Richman, and Terry

STT.06.02.060

CC KC MA207 F09: **79**/8/0/13/0 time 2:00
AS DH MA3321 Su12: **71**/14/14/0/0 time 0:50
CC KC MA207 F15: **100**/0/0/0/0 time 1:15
CC KC MA315 F15: **100**/0/0/0/0 time 0:45
CC KC MA207 F18: **95**/0/0/5/0
CC KC MA207 S19: **92**/0/8/0/0
CC KC MA315 S20: **96**/0/0/4/0

5. If the conclusion in a hypothesis test is to fail to reject H_0, we can conclude that there is strong evidence that the null hypothesis is true.

   (a) True, and I am very confident.

   (b) True, and I am not very confident.

   (c) False, and I am not very confident.

   (d) False, and I am very confident.

   Answer: (FALSE).

   by Roxy Peck for the textbooks: Roxy Peck and Jay Devore, Statistics: The Exploration and Analysis of Data, 6th Edition, Brooks/Cole Cengage Learning 2008 and Roxy Peck, Chris Olsen and Jay Devore, Introduction to Statistics and Data Analysis, 3rd Edition, Brooks/Cole Cengage Learning 2008.

   STT.06.02.070

   CC KC MA207 F09: 64/**36** time 1:45
   AS DH MA3321 Su12: 29/**71** time 1:20
   AS DH MA1333 010 F12: 22/22/22/**33** time 1:30
   AS DH MA1333 020 F12: 33/40/13/**13** time 1:30
   AS DH 1333 010 S13: 27/47/20/**7** time 2:30
   AS DH 1333 020 S14: 73/19/0/**8** time 2:00 ,
   AS DH 1333 010 F14: 52/20/16/**12** time 2:50 ,
   AS DH 1333 020 F15: 33/17/8/**42** time 2:00 ,
   CC KC MA207 F15: 0/0/10/**90** time 0:45
   CC KC MA315 F15: 7/7/0/**86** time 0:40
   CC KC MA207 F16: 53/20/7/**20**
   AS DH 1342 010 F17: 38/19/31/**13** time 2:00
   CC KC MA207 F18: 73/23/0/**5**
   AS DH 1342 020 F18: 15/35/30/**20** time 2:00
   CC KC MA207 S19: 20/36/20/**24**
   CC KC MA315 S19: 24/12/0/**65**
   AS DH 1342 040 S19: 21/29/14/**36** time 3:00
   AS DH 1342 030 F19: 0/5/0/**95** time 2:30

6. If we reject the null hypothesis, does this mean we should accept the alternative hypothesis?

   (a) Yes, and I am very confident.

   (b) Yes, and I am not very confident.

   (c) No, and I am not very confident.

   (d) No, and I am very confident.

   Answer: (Yes). Either the null hypothesis is correct or the alternative hypothesis is correct.

   by Project InterStats

   STT.06.02.080

   CC KC MA207 S19: **50**/17/20/4

7. The p-value tells us the probability that the null hypothesis is true.

   (a) True, and I am very confident.

   (b) True, and I am not very confident.

   (c) False, and I am not very confident.

   (d) False, and I am very confident.

   Answer: (False). The p-value tells us the probability of getting a sample with a test statistic equal to what we got, or even farther from the null hypothesis, assuming that the null hypothesis is true.

   by Kelly Cline

   STT.06.02.090

8. The p-value tells us the probability that our result is due to random chance.

   (a) True, and I am very confident.

   (b) True, and I am not very confident.

   (c) False, and I am not very confident.

   (d) False, and I am very confident.

Answer: (False). The p-value tells us the probability of getting a sample with a test statistic equal to what we got, or even farther from the null hypothesis, assuming that the null hypothesis is true.

by Kelly Cline

STT.06.02.100