Practice Problems 3C

For #1-32, fill out the following table to interpret the given P-value. Assume the P-value was calculated from data that passed all conditions.

	P-value	*P-value %*	*Significance Level %*	*Significance Level Proportion*	*Low P-value or High P-value?*	*Sample Data significantly disagree with H_0? (Yes or No)*	*Could be sampling variability or Unlikely?*	*Reject H_0 or fail to reject H_0?*
1.	0.238		5%					
2.	0.0003		1%					
3.	5.7×10^{-6}		10%					
4.	0.441		5%					
5.	0.138		1%					
6.	0		10%					
7.	0.043		5%					
8.	0.085		1%					
9.	1.4×10^{-4}		10%					
10.	0.112		5%					
11.	0		1%					
12.	0.539		10%					
13.	0.0006		10%					
14.	2.5×10^{-7}		1%					
15.	0.861		5%					
16.	0.199		5%					
17.	0.034		5%					
18.	0.128		1%					
19.	8.6×10^{-4}		10%					
20.	0.0437		5%					
21.	0		1%					
22.	0.612		10%					
23.	0.087		5%					
24.	0.0048		1%					
25.	5.5×10^{-7}		10%					
26.	0.0216		5%					
27.	0.444		1%					
28.	0.0539		10%					
29.	0.722		10%					
30.	3.8×10^{-3}		1%					
31.	0.0823		5%					
32.	0.0227		5%					

33. According to a CNN report, 93% of all Americans also own a traditional phone. We disagree with this report. We think that the percentage has decreased as more and more Americans opt to only use a cell phone and throw away their traditional phones. A random sample of 106 Americans was taken and 92 of them owned a traditional phone. The p-value was found to be 0.0168. Use a 5% significance level. The null and alternative hypothesis are given below. Assume the data passed all the conditions for the hypothesis test.

Ho: $\pi = 0.93$
Ha: $\pi < 0.93$ (claim)

a) If the null hypothesis is true, what is probability that the sample data or more extreme occurred because of sampling variability?

b) Write a standard p-value sentence to describe the true meaning of the p-value in the context of the problem.

c) Was the sample data significantly different than the population parameter in H_0? Explain why.

d) If H_0 was true, could the sample data have occurred because of sampling variability or is it unlikely to be sampling variability? (Could be or unlikely) Explain your answer.

e) Use the p-value and the significance level to decide whether we should reject the null hypothesis or fail to reject the null hypothesis. Explain why.

34. According to a recent Newspaper article, the population mean average amount of time people in California spend eating and drinking per day is 1.25 hours. In order to test this claim, we take a random sample of 400 people in California. The average number of hours for the sample was 1.22 and a p-value of 0.248 was found. Use a 10% significance level. The null and alternative hypothesis are given below. Assume the data passed all the conditions for the hypothesis test.

Ho: $\mu = 1.25$ hours (claim)
Ha: $\mu \neq 1.25$ hours

a) If the null hypothesis is true, what is probability that the sample data or more extreme occurred because of sampling variability?

b) Write a standard p-value sentence to describe the true meaning of the p-value in the context of the problem.

c) Was the sample data significantly different than the population parameter in H_0? Explain why.

d) If H_0 was true, could the sample data have occurred because of sampling variability or is it unlikely to be sampling variability? (Could be or unlikely) Explain your answer.

e) Use the p-value and the significance level to decide whether we should reject the null hypothesis or fail to reject the null hypothesis. Explain why.

35. According to an article in *USA Today,* 74% of Americans own a credit card. We disagree with the *USA Today* article. We claim that more than 74% of Americans own a credit card. In order to verify the claim that more than 74% of Americans have a credit card, a random sample of 250 Americans was taken and 77.2% of them owned a credit card and a p-value of 0.1244 was found. Use a 5% significance level. The null and alternative hypothesis are given below. Assume the data passed all the conditions for the hypothesis test.

Ho: π = 0.74
Ha: π > 0.74 (claim)

a) If the null hypothesis is true, what is probability that the sample data or more extreme occurred because of sampling variability?

b) Write a standard p-value sentence to describe the true meaning of the p-value in the context of the problem.

c) Was the sample data significantly different than the population parameter in H_0? Explain why.

d) If H_0 was true, could the sample data have occurred because of sampling variability or is it unlikely to be sampling variability? (Could be or unlikely) Explain your answer.

e) Use the p-value and the significance level to decide whether we should reject the null hypothesis or fail to reject the null hypothesis. Explain why.

36. It has long been thought that the population mean average body temperature is 98.6 degrees Fahrenheit. A recent study is now claiming that the population mean average body temperature is really lower than 98.6 degrees. A random sample of 50 adults worldwide was conducted and the average temperature was 98.26 degrees with a p-value of 0.0014 was found. Use a 1% significance level. The null and alternative hypothesis are given below. Assume the data passed all the conditions for the hypothesis test.

Ho: μ = 98.6 degrees Fahrenheit
Ha: μ < 98.6 degrees Fahrenheit (claim)

a) If the null hypothesis is true, what is probability that the sample data or more extreme occurred because of sampling variability?

b) Write a standard p-value sentence to describe the true meaning of the p-value in the context of the problem.

c) Was the sample data significantly different than the population parameter in H_0? Explain why.

d) If H_0 was true, could the sample data have occurred because of sampling variability or is it unlikely to be sampling variability? (Could be or unlikely) Explain your answer.

e) Use the p-value and the significance level to decide whether we should reject the null hypothesis or fail to reject the null hypothesis. Explain why.

37. It has been suggested that at least 10% of the world population is left handed. To test this claim, a sample of 77 randomly selected adults was taken and we found that 11 of them were left handed. A P-value of 0.895 was found. Use a 10% significance level. The null and alternative hypothesis are given below. Assume the data passed all the conditions for the hypothesis test.

Ho: $\pi \geq 0.1$ (claim)
Ha: $\pi < 0.1$

a) If the null hypothesis is true, what is probability that the sample data or more extreme occurred because of sampling variability?

b) Write a standard p-value sentence to describe the true meaning of the p-value in the context of the problem.

c) Was the sample data significantly different than the population parameter in H_0? Explain why.

d) If H_0 was true, could the sample data have occurred because of sampling variability or is it unlikely to be sampling variability? (Could be or unlikely) Explain your answer.

e) Use the p-value and the significance level to decide whether we should reject the null hypothesis or fail to reject the null hypothesis. Explain why.

(#38-40) Use the "theoretical distributions" menu in StatKey at www.lock5stat.com to look up the P-value. Click on the button that says "normal". Click on the tail and enter the test statistic in the bottom box below the tail. Remember in a two-tailed test, you will need to add the proportions in both tails to get the P-value.

38. Z-test statistic = 2.41
Two-tailed test
P-value =

39. Z-test statistic = −1.38
Left-tailed test
P-value =

40. Z-test statistic = 1.02
Right-tailed test
P-value =

(#41-43) Use the "theoretical distributions" menu in StatKey at www.lock5stat.com to look up the following critical values. Click on the button that says "*t*" and enter the given degrees of freedom. Click on the tail and enter the test statistic in the bottom box below the tail. Remember in a two-tailed test, you will need to add the proportions in both tails to get the P-value.

41. T-test statistic = −2.471
Two-tailed test
Degrees of Freedom = 29
P-value =

42. T-test statistic = 1.352
Right-tailed test
Degrees of Freedom = 34
P-value =

43. T-test statistic = −1.644
Left-tailed test
Degrees of Freedom = 49
P-value =

(#44-45) Use the "theoretical distributions" menu in StatKey at www.lock5stat.com to look up the following critical values. Click on the button that says " χ^2 " and enter the given degrees of freedom. Click on the tail and enter the test statistic in the bottom box below the tail. Remember in a two-tailed test, you will need to add the proportions in both tails to get the P-value.

44. χ^2-test statistic = 38.724
Right-tailed test
Degrees of Freedom = 29
P-value =

45. χ^2-test statistic = 12.551
left-tailed test
Degrees of Freedom = 39
P-value =
