Practice Problems Section 3B

(#1-20) For each of the following, use the given test statistic and critical value or values to answer the following questions.

a) Draw the indicated distribution and use the critical values to label the tails.

b) Does the test statistic fall in one of the tails or not?

c) Does the sample data significantly disagree with the null hypothesis? Explain how you know.

	Tail	Test Statistic	Critical Value
1	Two	Z = 2.47	±1.96
2	Left	T = −3.318	−1.747
3	Right	χ^2 = 6.943	12.33
4	Right	F = 1.126	3.881
5	Left	Z = −1.33	−1.645
6	Two	T = 1.994	±2.738
7	Right	χ^2 = 18.441	6.972
8	Right	F = 7.509	3.469
9	Two	Z = −2.72	±2.576
10	Left	T = −3.871	−2.114
11	Left	Z = −1.884	−2.576
12	Right	T = 0.472	1.577
13	Two	χ^2 = 11.943	2.346 & 9.841
14	Right	F = 5.218	2.791
15	Left	Z = −2.712	−1.96
16	Two	T = 1.138	±2.005
17	Right	χ^2 = 38.644	12.359
18	Right	F = 1.528	2.467
19	Left	Z = −0.72	−2.576
20	Two	T = −2.871	±2.334

(#21-23) Use the "theoretical distributions" menu in StatKey at www.lock5stat.com to look up the following critical values. Click on the button that says "normal". Then answer the questions.

21. Z-test statistic = 2.36
    Two-tailed test
    Significance Level = 5% (0.025 in each tail)

    Critical Values =

    Does the sample data significantly disagree with the null hypothesis? Explain why.

22. Z-test statistic = −1.48
    Left-tailed test
    Significance Level = 1% (0.01 in left tail)

    Critical Value =

    Does the sample data significantly disagree with the null hypothesis? Explain why.

23. Z-test statistic = 2.02
Right-tailed test
Significance Level = 10% (0.10 in right tail)

Critical Value =

Does the sample data significantly disagree with the null hypothesis? Explain why.

(#24-26) 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". Then answer the questions.

24. T-test statistic = −1.773
Two-tailed test
Degrees of Freedom = 29
Significance Level = 1% (0.005 in each tail)

Critical Values =

Does the sample data significantly disagree with the null hypothesis? Explain why.

25. T-test statistic = 2.871
Right-tailed test
Degrees of Freedom = 34
Significance Level = 10% (0.10 in right tail)

Critical Value =

Does the sample data significantly disagree with the null hypothesis? Explain why.

26. T-test statistic = −1.144
Left-tailed test
Degrees of Freedom = 49
Significance Level = 5% (0.05 in left tail)

Critical Value =

Does the sample data significantly disagree with the null hypothesis? Explain why.

(#27-29) 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 ". Then answer the questions.

27. χ^2-test statistic = 38.725
Right-tailed test
Degrees of Freedom = 29
Significance Level = 5% (0.05 in right tail)

Critical Value =

Does the sample data significantly disagree with the null hypothesis? Explain why.

28. χ^2-test statistic = 15.846
left-tailed test
Degrees of Freedom = 39
Significance Level = 10% (0.10 in left tail)

Critical Value =

Does the sample data significantly disagree with the null hypothesis? Explain why.

29. χ^2-test statistic = 5.119
two-tailed test
Degrees of Freedom = 19
Significance Level = 1% (0.005 in each tail)

Critical Value =

Does the sample data significantly disagree with the null hypothesis? Explain why.

(#30-32) Use the following one-population test statistic formula to calculate the one-population proportion Z-test statistic. Then write a sentence to explain the test statistic. The one-population proportion Z-test statistic tells us how many standard errors that the sample proportion is above or below the population proportion in the null hypothesis. If the test statistic is positive, then it is the number of standard errors above. If the test statistic is negative, then it is the number of standard errors below.

$$\text{One-Population Proportion Z-Test Statistic} = \frac{(Sample\ Proportion - Population\ Proportion)}{Standard\ Error}$$

30. Sample Proportion $(\hat{p})$ = 0.317
Population Proportion (π) = 0.25
Standard Error = 0.031

Z-test statistic =

Test Statistic Sentence:

31. Sample Proportion $(\hat{p})$ = 0.835
Population Proportion (π) = 0.9
Standard Error = 0.053

Z-test statistic =

Test Statistic Sentence:

32. Sample Proportion $(\hat{p})$ = 0.112
Population Proportion (π) = 0.2
Standard Error = 0.047

Z-test statistic =

Test Statistic Sentence:

(#33-35) Use the following one-population test statistic formula to calculate the one-population mean T-test statistic. Then write a sentence to explain the test statistic. The one-population proportion T-test statistic tells us how many standard errors that the sample mean is above or below the population mean in the null hypothesis. If the test statistic is positive, then it is the number of standard errors above. If the test statistic is negative, then it is the number of standard errors below.

$$\text{One-Population Mean T-Test Statistic} = \frac{(Sample\ Mean - Population\ Mean)}{Standard\ Error}$$

33. Sample Mean $(\bar{x})$ = 135.7 mg
Population Mean (μ) = 100 mg
Standard Error = 23.9 mg

T-test statistic =

Test Statistic Sentence:

34. Sample Mean $(\bar{x})$ = 89.26 °F
Population Mean (μ) = 89.6 °F
Standard Error = 0.108 °F

T-test statistic =

Test Statistic Sentence:

35. Sample Mean $(\bar{x})$ = 52.71 thousand dollars
Population Mean (μ) = 60 thousand dollars
Standard Error = 6.42 thousand dollars

T-test statistic =

Test Statistic Sentence:
