practice (CH8)

Name_____

Solve the problem.

1) How many tissues should a package of tissues contain? Researchers have determined that a person uses an average of 42 tissues during a cold. Suppose a random sample of 10,000 people yielded the following data on the number of tissues used during a cold: $\bar{x} = 37$, $s = 25$. Identify the null and alternative hypothesis for a test to determine if the mean number of tissues used during a cold is less than 42.

    A) $H_0: \mu = 42$ vs. $H_a: \mu < 42$ B) $H_0: \mu = 42$ vs. $H_a: \mu \neq 42$

    C) $H_0: \mu = 42$ vs. $H_a: \mu > 42$ D) $H_0: \mu > 42$ vs. $H_a: \mu \leq 42$

1) _____

2) How many tissues should a package of tissues contain? Researchers have determined that a person uses an average of 58 tissues during a cold. Suppose a random sample of 10,000 people yielded the following data on the number of tissues used during a cold: $\bar{x} = 49$, $s = 19$. We want to test the alternative hypothesis $H_a: \mu < 58$. State the correct rejection region for $\alpha = .05$.

    A) Reject H_0 if $z < -1.96$.   B) Reject H_0 if $z > 1.96$ or $z < -1.96$.

    C) Reject H_0 if $z > 1.645$.   D) Reject H_0 if $z < -1.645$.

2) _____

3) The hypotheses for $H_0: \mu = 125.4$ and $H_a: \mu \neq 125.4$ are tested at $\alpha = .10$. Sketch the appropriate rejection region.

3) _____

4) A cereal company claims that the mean weight of the cereal in its packets is 14 oz. Identify the type I error for the test.

    A) Fail to reject the claim that the mean weight is 14 oz when it is actually different from 14 oz.

    B) Reject the claim that the mean weight is different from 14 oz when it is actually 14 oz.

    C) Reject the claim that the mean weight is 14 oz when it is actually greater than 14 oz.

    D) Reject the claim that the mean weight is 14 oz when it is actually 14 oz.

4) _____

5) I want to test $H_0: p = .6$ vs. $H_a: p \neq .6$ using a test of hypothesis. If I concluded that p is .6 when, in fact, the true value of p is not .6, then I have made a _____.

    A) Type I and Type II error   B) Type II error

    C) Type I error   D) correct decision

5) _____

6) Given $H_0: \mu = 25$, $H_a: \mu \neq 25$, and $p-value = 0.034$. Do you reject or fail to reject H_0 at the .01 level of significance?

    A) fail to reject H_0

    B) reject H_0

    C) not sufficient information to decide

6) _____

7) The health of employees is monitored by periodically weighing them in. A sample of 54   7) _____
employees has a mean weight of 183.9 lb and the standard deviation is 121.2 lb, use a 0.10
significance level to test the claim that the population mean of all such employees weights
is less than 200 lb.

Step1: (State the null and alternative hypotheses mathematically and in words of the
problem.)

Step2: (calculate the value of the test statistic)

Step3:(find the rejection region.)
*step3:(calculate the p–value)

Step4: (Make a decision .)

Step 5: (State a complete conclusion.)

8) Test the claim that the mean lifetime of car engines of a particular type is greater than   8) _____
220,000 miles. Sample data are summarized as $n = 23$, $\bar{x} = 226{,}450$ miles, and
$s = 11{,}500$ miles. Use a significance level of $\alpha = 0.01$.

Step1: (State the null and alternative hypotheses mathematically and in words of the
problem.)

Step2: (calculate the value of the test statistic)

Step3:(find the rejection region.)

Step4: (Make a decision .)

Step 5: (State a complete conclusion.)

9) A telephone company claims that 20% of its customers have at least two telephone lines.   9) _____
The company selects a random sample of 500 customers and finds that 88 have two or
more telephone lines. At $\alpha = 0.05$, does the data support the claim?

Step1: (State the null and alternative hypotheses mathematically and in words of the
problem.)

Step2: (calculate the value of the test statistic)

Step3:(find the rejection region.)
*step3:(calculate the p–value)

Step4: (Make a decision .)

Step 5: (State a complete conclusion.)

10) A poll of 1,068 adult Americans reveals that 48% of the voters surveyed prefer the 10) _____
Democratic candidate for the presidency. At the 0.05 level of significance, do the data
provide sufficient evidence that the percentage of all voters who prefer the Democrat is
less than 50%?

Step1: (State the null and alternative hypotheses mathematically and in words of the
problem.)

Step2: (calculate the value of the test statistic)

Step3:(find the rejection region.)
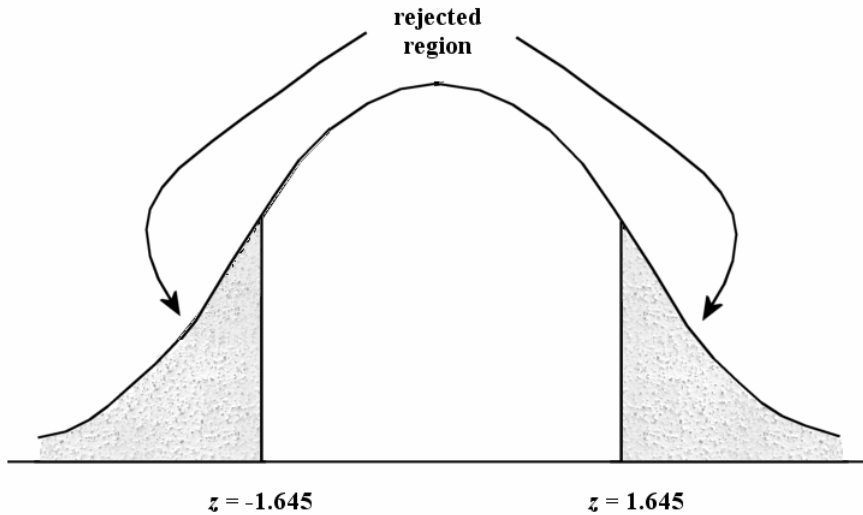*step3:(calculate the p–value)

Step4: (Make a decision .)

Step 5: (State a complete conclusion.)

1) A
2) D
3)

        $z = -1.645$ $z = 1.645$

4) D
5) B
6) A
7) H_0: $\mu = 200$; H_1: $\mu < 200$; Test statistic: $z = -0.98$. P–value: 0.1635. Fail to reject H_0. There is not sufficient evidence to support the claim that the mean is less than 200 pounds.
8) $\alpha = 0.01$
   Test statistic: $t = 2.6898$
   P–value: $p = 0.0066$
   Critical value: $t = 2.508$
   Because the test statistic, $t > 2.508$, we reject the null hypothesis. There is sufficient evidence to accept the claim that $\mu > 220{,}000$ miles.
9) H_0: $p = 0.11$ H_a: $p \neq 0.11$.
   $\alpha = 0.05$
   Test statistic: $z = 5.29$. Critical values: $z = \pm 1.96$.
   Reject H_0. At the 5% level of significance, the data provide sufficient evidence to conclude that the proportion of all children in the town who suffer from asthma is different from 11%.
10) H_0: $p = 0.5$ H_a: $p < 0.5$.
   $\alpha = 0.05$
   Test statistic: $z = -1.31$. Critical value: $z = -1.645$.
   Do not reject the null hypothesis. At the 5% level of significance, the data do not provide sufficient evidence to conclude that the percentage of voters who prefer the Democrat is less than 50%.