Stat 401 Minitab 17 Project 2

The following instructions are for Minitab 17. The commands and menu selections for Minitab 15, Minitab 16 and Mintab Express should be similar. (If there are differences, I suggest you use the Help menu, or Internet search, to help figure things out.)

Purpose: I. To use MINITAB to conduct large and small sample hypothesis tests for a population mean.
II. To use MINITAB to conduct a hypothesis test for a population proportion.

Reading: Text, Chapter 8 on Hypothesis Tests.

Turn in: A. Print outs of the session windows for each of the three hypothesis tests.
B. The answers to the questions as indicated below.

General Instructions: What follow are the Minitab commands for conducting hypothesis tests. Words in capital letters followed by the symbol > indicate a sequence of menu items to be selected/clicked.

I.a. Hypothesis Test of a Population Mean – Text example 8.8 (9th and 8th editions)

A. Begin by opening the Excel spreadsheet file "Stat401 MINITAB 17 Project 2 data I.a".
Highlight and copy the numbers in column A, rows 1 through 52.
Open Minitab and paste the 52 numbers into column C1.
(Alternately, you could enter the 52 values into column C1 in Minitab by hand.)

You are going to use Minitab to reproduce the large-sample hypothesis test that the text does as Example 8.8.

STAT > BASIC STATISTICS >1-SAMPLE Z…
The pull-down menu to the upper right should say "One or more samples, each in a column".
In the dialog box underneath this pull-down menu, type in "C1".
For "Known standard deviation:", enter 12.2647. [This is the sample value *s* provided by the text.]
Check "Perform hypothesis test" and enter "Hypothesized mean:" 30.
Click on the "Options…" button.
Set "Confidence level:" to 95.0. [This matches the given significance level of $\alpha = 0.05$.]
Use the pull-down menu to select "Mean < hypothesized mean".
Click on the "OK" button in the "Options…" dialog box.
Click on the "OK" button in the "One-Sample Z for the Mean" dialog box.

B. Answer the following.
1. State the null and alternate hypotheses.
2. State the sample mean found by Minitab. Is it the same as the sample mean found by the text?
3. State the *p*-value found by Minitab. Is it the same as the *p*-value found by the text?

I.b. Hypothesis Test of a Population Mean – Text 9th edition homework exercise #38 (8th edition #58)

A. Either clear the previous entries in Minitab column C1, or open a new Minitab worksheet.
Enter the 30 values from the text exercise into column C1 in Minitab by hand.

You are going to use Minitab to conduct the hypothesis test of this text homework exercise.
The text notes that the assumption of a normal population distribution is justified.

STAT > BASIC STATISTICS >1-SAMPLE t…
Follow the same instructions as for the *z*-test of I.a.
For a Minitab *t*-test, you will not be asked to enter "Known standard deviation:".
Read the exercise carefully to determine the correct
"Hypothesized mean:", "Confidence level:", Lower-tailed, two-tailed, or upper-tailed test.

B. Answer the following.
1. State the null and alternate hypotheses.
2. State the sample mean and sample standard deviation found by Minitab.

3. State the value of the hypothesis test statistic found by Minitab.
4. State the *p*-value found by Minitab.
5. State whether this *p*-value would indicate "reject the null hypothesis" or "fail to reject the null hypothesis" at the given level of significance.
6. State a conclusion in words, in the context of the given situation.
7. Answer the text's question, "Would your conclusion be different if $\alpha = 0.05$ had been used?"
8. For the hypotheses tested, describe in context what the Type I and Type II errors would be, and say which type of error might have been committed.

II.a. Hypothesis Test of a Population Proportion – Text 9th ed. homework exercise #44a (8th edition #38a)

A. Either clear the previous entries in Minitab column C1, or open a new Minitab worksheet.

You are going to use Minitab to conduct the hypothesis test of this text homework exercise.

STAT > BASIC STATISTICS >1 PROPORTION…
The pull-down menu to the upper right should say "Summarized data".
Check "Perform hypothesis test".
Read the exercise carefully to determine the correct
"Number of events" = observed value for random variable *X*
"Number of trials"
"Hypothesized proportion" [decimal format, not percent].
Click on the "Options…" button.
Read the exercise carefully to determine the correct
"Confidence level:", Lower-tailed, two-tailed, or upper-tailed test.
Use the pull-down menu to select "Method:" Normal approximation.
Click on the "OK" button in the "Options…" dialog box.
Click on the "OK" button in the "One-Sample Proportion" dialog box.

B. Answer the following.
1. Define random variable *X* in this situation, i.e. "*X* = …" followed by a word description of what *X* is counting.
2. State the null and alternate hypotheses.
3. Conduct the test to verify that this is a large-sample (normal approximation) case.
4. State the sample proportion found by Minitab.
5. State the value of the hypothesis test statistic found by Minitab.
6. State the *p*-value found by Minitab.
7. State whether this *p*-value would indicate "reject the null hypothesis" or "fail to reject the null hypothesis" at the given level of significance.
8. State a conclusion in words, in the context of the given situation.

II.b. Hypothesis Test of a Population Proportion – Text 9th ed. homework exercise #44a (8th edition #38a)

A. Either clear the previous entries in Minitab column C1, or open a new Minitab worksheet.

You are going to use Minitab to conduct the same hypothesis test as in II.a., but have Minitab do so as a small-sample case.

STAT > BASIC STATISTICS >1 PROPORTION…
The steps are the same as in II.a., with the exception that you'll use the pull-down menu to select "Method:" Exact.

B. Answer the following.
1. State the *p*-value found by Minitab.
2. How does this "Exact value" *p*-value compare to the "Normal approximation value" found in II.a.?
3. Would the conclusion of this "Exact value" test of proportions be the same as the "Normal approximation value" conclusion found in II.a.? Explain why or why not.