Illustrations of using the menus in Minitab 17

for confidence intervals and hypothesis tests on means and proportions.

The output for all of these is read in the same way and is discussed in a different document. (It is not different from that of Minitab 16.) This document is focused on using the menus correctly to produce the output.

The first step is to choose the menu Stat > Basic Statistics and then choose an appropriate choice for your data.

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All six of the following commands have very similar dialog boxes. I will show the first one in detail and then discuss and show what is different about each of the following commands.

- 1-sample Z pages 2-4
- 1-Samplet pages 2-4
- Paired t page 5
- 2-Sample t page 6
- 1 Proportion page 7
- 2 Proportions page 8

Notice that the drop-down box gives two choices for the data.

Note that the "Graphs" button is only available when we have the individual data values because we could not produce a graph of the data from just the value from the summarized data.

One o	or more samples, each in a column	(One-Sample Z for the Mean					
				One or more samples, each in a column				
Ŧ	C1			Length				
	Length							
1	2.4			Known standard deviation: 0.12				
2	2.1			Perform hypothesis test				
3	2.3			Hypothesized mean:				
4	1.9		Select	Options				
	method assumes you know the population							
stand	lard deviation. In this example, it is 0.012.		Help	<u>CK</u> Cancel				
Sumn	marized data	ſ	One-Sample Z for the N	lean 📃 🔨				
	into the dialog box the following mation:			Summarized data Sample size: 29 Sample mean: 2.082				
•	Sample size			Known standard deviation: 0.12				
•	Sample mean			Perform hypothesis test Hypothesized mean:				
			Select	Options				
			Help	QK Cancel				

The same dialog box is used to do either a confidence interval or a hypothesis test. It does a confidence interval automatically and only does a hypothesis test if you check that box in the dialog box shown above.

When you choose the Options button, you are allowed to change the confidence level (just type in a new number) and to choose which type of hypothesis test you want: two-sided or left-tailed or right-tailed.

C	Dne-Sample Z for the Mean	J
	Summarized data	
	Sample size: 29	
	One-Sample Z: Options	
	Confidence level: 90	
	Alternative hypothesis: Mean ≠ hypothesized mean 💌	
	Help QK Cancel	
	Select Options Graphs	1
	Help QK Cancel	

Here is a screenshot of the drop-down list for the choices for the alternative hypothesis, which are

- Mean ≠ hypothesized mean
- Mean < hypothesized mean
- Mean > hypothesized mean

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Session									
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Welcome to Minitab, press F1 for help. One-Sam	ample Z for the Mean								
	Summarized data								
	Sample size:								
	One-Sample Z: Options								
	Confidence level: 95.0								
	Alternative hypothesis: Mean ≠ hypothesized mean 💌	▶							
Worksheet 1 ***	Mean < hypothesized mean Mean + hypothesized mean								
+ C1 C2 C3 C4 C5 C6 C7	Help Mean > hypothesized mean C14 C15 C16 C17 C18 C19	C20 ^							
1	Select Options Graphs								
2	ielp QK Cancel								
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When you have the full data set and the Graphs button is available, then you may choose any or all of the following graphs to obtain a picture of the data.

C	Dne-Sample Z for the Mean	23
	One or more samples, each in a column	•
	One-Sample Z: Graphs) Ĵ
	✓ Histogram ✓ Individual value plot ✓ Boxplot	
	Help <u>QK</u> Cancel	hs
	Help <u>QK</u> Car	

The Individual Value Plot is similar to a dotplot, but the dots are just put on top of each other instead of stacked up. Histograms and Boxplots are as described in our course.

1-Sample t

This is done in the same way as the 1-sample Z.

The difference is that you do not have a known standard deviation, so there is no box for that. In the option for "summarized data" you must give both the sample mean and the sample standard deviation as well as the sample size.

Paired t

Instead of using this menu item to analyze paired quantitative data, you can, of course, do a paired t procedure by simply finding the differences for each pair and then doing a 1-Sample t procedure on those differences.

It is vital to remember that in order to understand what is being done by the Paired t command.

Method 1: Used the Paired t command

There are two choices for the data entry.

Each sample is in a column	Summarized data					
	To use this, first look at Method 2 below to find the					
Paired t for the Mean	differences efficiently so that you can use					
C1 Subject Each sample is in a column	Stat > Basic Statistics > Display Descriptive Statistics					
C2 With	to find the mean and standard deviation of the					
C3 Without Sample 1: With	differences.					
Sample 2: Without	Paired t for the Mean					
	Summarized data (differences)					
	Sample size: 21					
	Sample mean: 5.2					
Select Options	Stan <u>d</u> ard deviation: 8.173					
Help <u>QK</u> Cancel	Select Optio<u>n</u>s <u>G</u> raphs					
	Help <u>QK</u> Cancel					

Method 2: Find the differences

0	rigi	nal data			Ca	lc >	Calc	culator			Wo	rksheet	after	the	
					an	nd do	b thi	s to compu	te the		con	nmand	to cal	culate	
					di	ffere	nce	s and store	them in Col 4		diff	erences	5		
					Cal	2 With		Store result in variable Expression:	: C4						
						.5 WILLO		C2 - C3	Í Ó		+	C1 Subject	C2 With	C3 Without	C4
_									Top line: Enter		1	1	87	82	5
	ŧ	C1	C2	C3				7 8 9 +	where to store differences.		2	2	91	93	-2
		Subject	With	Without				4 5 6 - <			3	3	75	67	8
	1	1	87	82				1 2 3 * :	Box: Enter the	L	4	4	81	70	11
	2	2	91	93				0 · [] /	expression to calculate. In this	L					
	3	3	75	67		Selec	st	0	case, subtraction.		lt's	a good	idea t	o type i	n a
	4	4	81	70						L	labe	el like "	Differ	ence" fo	or
				. 1		Help		Assign as a formu	OK Cancel		Col	umn 4.			

Then use the 1-Sample t command to analyze Column 4 of the differences.

2-Sample t

This is done in a similar way to the 1-sample t.

There are two differences.

- There are three ways the data may be given. See illustrations below.
- The "Graph" choices do not include Histogram.
 - The graphs which are produced are "comparative graphs" meaning that the graphs of the two groups are shown side-by-side on the same scale to make comparisons easy.

Both samples are in one column

C4-T	C5
Group	Length
Blue	2.3
Yellow	1.8
Yellow	2.4
Blue	2.2
Blue	2.1

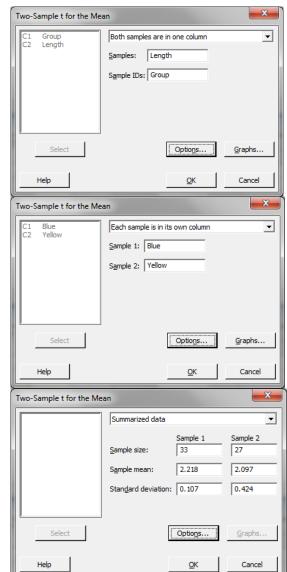
Each sample is in its own column

Ŧ	C1	C2
	Blue	Yellow
1	2.3	1.8
2	2.2	2.4
3	2.1	

Summarized data

For **each sample**, type into the dialog box the following information:

- Sample size
- Sample mean
- Sample standard deviation



1 Proportion

This dialog box is very similar to the 1-Sample t dialog box. Again, there are two ways to enter the data:

- a list of all the data
- summarized values ("number of events" and "number of trials.")

In the second dialog box, you choose whether to use the "normal approximation" method or the "exact" method.

The normal approximation method is the method used in our text in Chapters 20 and 21, where z-scores are used. (Exact would be using the methods of Binomial distributions to do inference, which we do not cover in this course.)

Normal approximation:

Exact:

One-Sample Proportion	One-Sample Proportion
Summarized data	Summarized data
One-Sample Proportion: Options	One-Sample Proportion: Options
Confidence level: 95.0	Confidence level: 95.0
Alternative hypothesis: Proportion ≠ hypothesized proportion	Alternative hypothesis: Proportion ≠ hypothesized proportion
Method: Normal approximation	Method:
Help <u>QK</u> Cancel	Help <u>QK</u> Cancel
Help <u>QK</u> Cancel	Help <u>QK</u> Cancel

2 Proportions

This dialog box is very similar to the 2-Sample t dialog box. It has the same three choices about how to enter the data:

- Both samples are in one column
- Each sample is in a separate column
- Summarized data

However, in the second dialog box, there is a new choice for the "Test method."

ſ	Two	o-Sample Proportion	
	ſ	Two-Sample Proportion: Options	Choose "Use the pooled estimate of the
		Difference = (sample 1 proportion) - (sample 2 proportion)	proportion"
	Ŀ	Confidence level: 95.0	in a hypothesis test when the null hypothesis
		Hypothesized difference: 0.0	says that the two population proportions are
		Alternative hypothesis: Difference ≠ hypothesized difference	equal.
	2	Test method: Use the pooled estimate of the proportion	
		Help <u>Q</u> K Cancel	
		Help <u>O</u> K Cancel	
ſ	Tw	ro-Sample Proportion	Choose "Estimate the
	Í	Two-Sample Proportion: Options	proportions separately" when forming
		Difference = (sample 1 proportion) - (sample 2 proportion)	a confidence interval
	H	Confidence level: 95.0	for the difference of two proportions.
		Hypothesized difference: 0.0	
		Alternative hypothesis: Difference ≠ hypothesized difference ▼	
d	4	Test method: Estimate the proportions separately	
		Help <u>O</u> K Cancel	
1	_	Help <u>OK</u> Cancel	