

NAME: _____
Date: _____

Statistics ... Business Statistics

Estimation

In this class we have discussed z-intervals and t-intervals as ways to estimate averages. Answer these questions:

- Z** _____ 1. Which statistic (**z** or **t**) is most often used when a large sample is available?
People sometimes say “t is for tiny – z is for zoo-mongous”
- B** _____ 2. How large does a sample have to be to be considered a “large” sample in statistics?
A. 10 B. 30 C. 100 D. 300 E. 1000

The TI-83 input screens for interval estimation look like the screen illustrations below:

ZInterval Inpt:Data Stats σ : \bar{x} : n: C-Level: Calculate	TInterval Inpt:Data Stats \bar{x} : Sx: n: C-Level: Calculate	1-PropZInt Inpt:Data Stats x: n: C-Level: Calculate
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On these input screens ...

- n** _____ 3. Which variable stands for the total number in a sample?
- σ and Sx** _____ and _____ 4. Which two variables stand for **standard deviation**?
- \bar{x} _____ 5. Which variable stands for the **mean** (average) of the sample?
- .95** _____ 6. If a problem refers to 95% confidence, what would you enter for “C-Level”?
(On a TI-84, you could just type 95, but on a TI-83 it needs to be the decimal.)
- n** _____ 7. In a 1-proportion z-test, which is larger, “x” or “n”?

The results from a TI-83 interval estimate screen are shown below:

```
TInterval  
(1249.1,1294.9)  
 $\bar{x}$ =1272  
Sx=37  
n=9
```

Use this information to answer the questions below.

- 22.9** _____ 8. What is the **margin of error** in the t-interval problem shown above?

```
1294.9-1272
                22.9
```

Find these confidence intervals. You will most likely use a graphing calculator and write your answer in the form { LB , UB }.

_____9.

A survey of 725 American adults, found that 583 of them plan to eat turkey for Thanksgiving dinner. Use this information to find an 85% confidence interval (**1-proportion z-interval**) for the actual percentage of Americans that plans to eat turkey for Thanksgiving dinner.

```
EDIT CALC 1:1-PropZInt
5↑1-PropZTest...
6:2-PropZTest...
7:ZInterval...
8:TInterval...
9:2-SampZInt...
0:2-SampTInt...
1:1-PropZInt...
```

```
1-PropZInt
x:583
n:725
C-Level: .85
Calculate
```

```
1-PropZInt
(.78292, .82536)
P=.804137931
n=725
```

The answer on this and every problem after is he parentheses. Here it's **(.78292 , .82536)**, which means the actual percentage is between 78% and 83%.

_____10.

Sophia keeps track of how many e-mails she receives in a day. She counts for 15 straight days and finds an average of 14 e-mails a day, with a standard deviation of 6.2 . Use this information to find a 90% confidence interval (**t-interval**) for the overall average number of e-mails she gets.

```
EDIT CALC 1:1-PropZInt
2↑T-Test...
3:2-SampZTest...
4:2-SampTTest...
5:1-PropZTest...
6:2-PropZTest...
7:ZInterval...
8:TInterval...
```

NOTE: If "Data" is highlighted on your calculator, you must use the right arrow and hit ENTER to select "Stats".

```
TInterval
Inpt: Stats
List: L1
Freq: 1
C-Level: .85
Calculate
```

```
TInterval
Inpt: Data Stats
x̄: 0
Sx: 0
n: 725
C-Level: .85
Calculate
```

→

```
TInterval
Inpt:Data Stats
x̄:14
Sx:6.2
n:15
C-Level:.9
Calculate
```

```
TInterval
(11.18,16.82)
x̄=14
Sx=6.2
n=15
```

(NOTE: It takes longer for the calculator to compute a T-Interval than the other estimation problems. This is normal.)

11. At the daily mass at St. Cecelia's one morning, there were 32 people present. Fr. Girres counted and found that 23 of those who were there for morning mass were women. Use this information to find a 99% confidence interval (**1-proportion z-interval**) for the actual percentage of people at daily mass who are women.

```
1-PropZInt
x:23
n:32
C-Level:.99
```

```
1-PropZInt
(.51402,.92348)
p̂=.71875
n=32
```

12. A sample of 17 airline flights from Minneapolis to Los Angeles finds an average price of \$421.39 with a standard deviation of \$72.94. Use this information to find an 85% interval estimate (**t-interval**) for the actual average cost of flights between Minneapolis and Los Angeles.

```
TInterval
Inpt:Data Stats
x̄:421.39
Sx:72.94
n:17
C-Level:.85
Calculate
```

```
TInterval
(394.64,448.14)
x̄=421.39
Sx=72.94
n=17
```

13. A sample of 290 commuters in the New York City area was asked how long it took them to get from home to work. In the sample, the average time to get from home to work was 47 minutes, and the standard deviation was 13.9 minutes. Use this information to find a 90% confidence interval (**z-interval**) for the average commuting time for workers in the New York area.

```
EDIT CALC Stats
1:Z-Test...
2:T-Test...
3:2-SampZTest...
4:2-SampTTest...
5:1-PropZTest...
6:2-PropZTest...
7:ZInterval...
```

```
ZInterval
Inpt:Data Stats
σ:13.9
x̄:47
n:290
C-Level:.9
Calculate
```

```
ZInterval
(45.657,48.343)
x̄=47
n=290
```

NOTE: Be careful of the order you enter the variables. It's different on Z-Intervals and T-Intervals.

14. Mr. Burrow looked at all the *Bear Facts* shows that were recorded in the past five years. He found that out of 175 shows the average time for a show was 292 seconds, with a standard deviation of 16.6 seconds. Use this information to find a 99% confidence interval (**z-interval**) for the average time of all the *Bear Facts* shows that have been recorded over the past 16 years.

```
ZInterval
Inpt:Data Stats
σ:16.6
x̄:292
n:175
C-Level: .99
```

```
ZInterval
(288.77, 295.23)
x̄=292
n=175
```

15. A convenience store kept track of how much each person who pulled up to the pumps spent on gas. They sampled 14 people and found they spent an average of \$48.17, with a standard deviation of \$17.16. Use this information to find an interval estimate (**t-interval**) with 95% confidence for the average amount all people spend on gas.

```
TInterval
Inpt:Data Stats
x̄:48.17
Sx:17.16
n:14
C-Level: .95
Calculate
```

```
TInterval
(38.262, 58.078)
x̄=48.17
Sx=17.16
n=14
```

Find these confidence intervals. You will most likely use a graphing calculator and write your answer in the form { LB , UB }.

16. The U.S. Bureau of Labor Statistics collects information on the ages of people in the labor force. They sample 50 workers and find an average age of 44.7 years. The standard deviation for all workers is 12.1 years. Use this information to find a 99% confidence interval (**z-interval**) for the mean age μ of all people in the labor force.

```
ZInterval
Inpt:Data Stats
σ:12.1
x̄:44.7
n:50
C-Level: .99
Calculate
```

```
ZInterval
(40.292, 49.108)
x̄=44.7
n=50
```

17. Igor wants to know how many French fries there are in an average serving. He goes to McDonalds and buys 9 orders of medium fries and counts how many fries are in each one. He finds the average is 36 fries, with a standard deviation of 5. Use this information to find a 90% confidence interval (**t-interval**) for the actual average number of fries in a medium order at McDonalds.

```
TInterval
Inpt:Data Stats
x̄:36
Sx:5
n:9
C-Level:.9
Calculate
```

```
TInterval
(32.901,39.099)
x̄:36
Sx:5
n:9
```

18.

In surveying how many licks it took to get to the center of a Tootsie-Pop®, a group in Statistics class found that 18 out of 30 people bit the sucker before they got to the center. Use this information to find a 90% interval estimate (**1-proportion z-interval**) of the actual percentage of people who would bite a Tootsie-Pop® before they reach the center.

```
1-PropZInt
x:18
n:30
C-Level:.9
Calculate
```

```
1-PropZInt
(.45288,.74712)
p̂:.6
n:30
```

19.

The Fluffy Fun pet toy company sells boxes of catnip. A sample of 40 of their “jumbo” boxes of catnip found that they weighed an average of 16.3 ounces, with a standard deviation of 0.04 ounces. Use this information to find a 95% estimate (**z-interval**) for the mean weight of the entire population of jumbo boxes of catnip.

```
ZInterval
Inpt:Data Stats
σ:.04
x̄:16.3
n:40
C-Level:.95
```

```
ZInterval
(16.288,16.312)
x̄:16.3
n:40
```

20.

A sample of 8 cups of coffee finds that the average temperature of the coffee is 152° with a standard deviation of 10°. Find an estimate (**t-interval**) for the actual average temperature of coffee, with 95% confidence.

```
TInterval
Inpt:Data Stats
x̄:152
Sx:10
n:8
C-Level:.95
```

```
TInterval
(143.64,160.36)
x̄:152
Sx:10
n:8
```

21.

The Indiana Department of Education surveyed 350 high school boys in that state and asked them if they participated in any illegal activities in the past week. 182 of the boys admitted that they had participated in at least one illegal activity in the past week. Use this information to find a 99% confidence interval (**1-proportion z-**

interval) for the actual percentage of high school boys in Indiana who have participated in illegal activities in the past week.

```
1-PropZInt
x:182
n:350
C-Level:.99
Calculate
```

```
1-PropZInt
(.45121,.58879)
P=.52
n=350
```