

STA 1013 : Statistics through Examples

Lecture 5: Calculator (TI 84 plus)

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1. Calculator

1.1 Bar Chart & Pie Chart

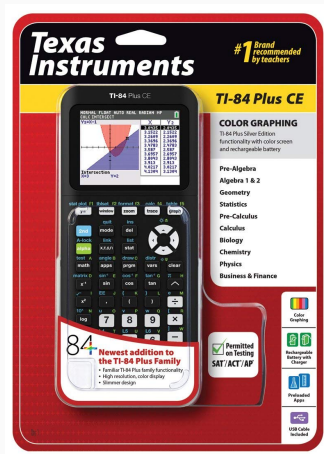
1.2 List & List sorting (for Stem-Leaf plot)

1.3 Sampling : Random Number generator & Sequence generator

Calculator

Calculator

TI 84 plus series

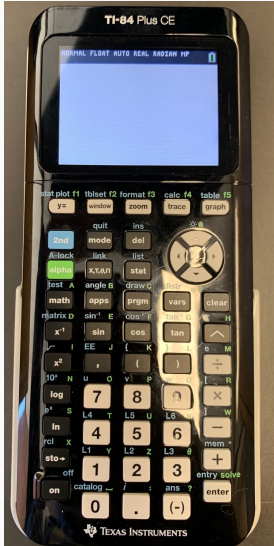


Required functions

- Box plot, Histogram
- Summary Statistics (Mean, Variance, \dots)
- Normal Distributions
- Simple Linear Regression
- One-sample Confidence Intervals
- One-sample Hypothesis Tests

Note : The TI-30X calculators will not suffice for this class.

Calculator



- Blue letter : First Press 2nd

off : 2nd + on

quit : 2nd + mode

stat plot : 2nd + y=

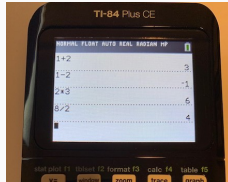
- Green letter : First Press alpha

X : alpha + sto →

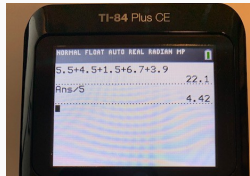
: : alpha + .

Simple Arithmetic

- $+$, $-$, \times , \div



- Example : Average of (5.5 , 4.5 , 1.5 , 6.7 , 3.9) ?



Bar Chart

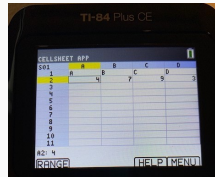
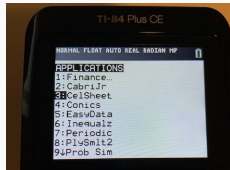
Grade	A	B	C	D	F
Count	4	7	9	3	2

- Draw the Bar chart, and Pie chart for the Essay Grade data
- Use the **CelSheet** app in our calculator

Bar Chart

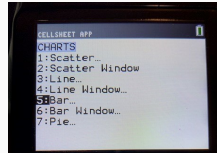
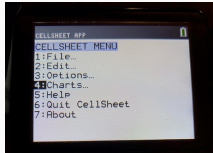
1. First record the data by using CelSheet app

- apps → 3: CelSheet
- In the first row : Enter the category names
To type the letter in the cell, first press "
eg : "A : alpha + + + alpha + math
- In the second row : Enter the count values



Bar Chart

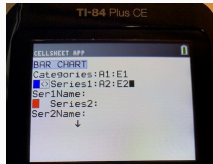
2. MENU (press graph) → 4:Charts + enter → 5:Bar



3. Enter the range for the category labels at the Categories prompt : our case (A1:E1)

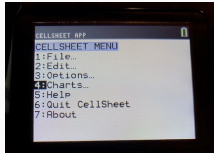
4. Enter the range for the data values at Series prompt : (A2:E2)

5. Draw

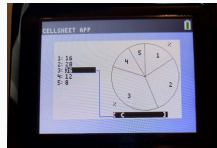
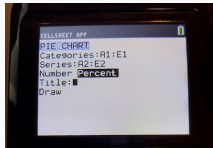


Pie Chart

1. Same as the above in the Bar chart
2. MENU (press graph) → 4:Charts + enter → 7:Pie



3. Enter the Categories : our case (A1:E1)
4. Enter the Series : (A2:E2) , and Draw



Gender	Count
Female	23,624
Male	18,094
Total	41,718

Table 1: Frequency Table of FSU 2018 gender data

Draw a Bar chart and a Pie chart.

Practice

The table given below lists the eight countries that emit the most Carbon dioxide (CO_2) each year. **Construct the Bar and Pie chart.**

Country	Total CO_2 emissions
United States (US)	5,833
China (CH)	6,534
Russia (RS)	1,729
Japan (JP)	1,495
India (ID)	1,214
Germany (GM)	829
Canada (CN)	574
United Kingdom (UK)	572

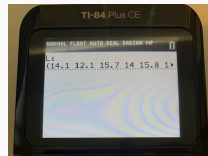
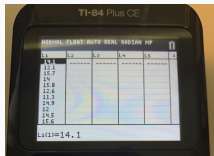
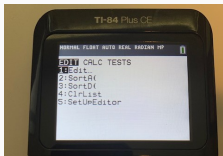
List

Below are the weights (lbs) of the 4-month-old babies.

14.1	12.1	15.7	14.0	15.8	12.6	11.3	14.9	12.0	14.5
15.6	15.3	12.9	14.8	11.4	16.8	14.3	11.4	15.0	14.6
12.6	14.4	16.2	15.2	16.4	14.8	11.6	14.9	16.7	15.2

We will store the above data as a list in our calculator

1. `stat` → 1:Edit...
2. Take numbers in the cells (L1)
: 14.1 + `enter` 12.1 + `enter` ...

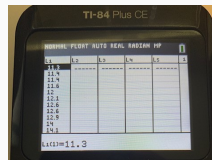
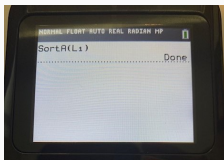
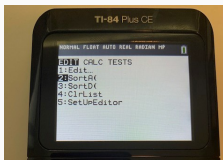


Sort the List

We will **sort** the list (L1) → **Useful for drawing Stem-Leaf plot**

11.3	11.4	11.4	11.6	12.0	12.1	12.6	12.6	12.9	14.0
14.1	14.3	14.4	14.5	14.6	14.8	14.8	14.9	14.9	15.0
15.2	15.2	15.3	15.6	15.7	15.8	16.2	16.4	16.7	16.8

1. `stat` → 2:SortA (A : Ascending)
2. SortA(**L1**)



Practice

The following are 24 soil pH measurements:

10.0	9.3	6.2	8.4	6.7	8.2	9.6	7.4	6.8	8.1	7.9
8.0	7.8	7.7	6.5	8.7	9.0	6.1	9.5	7.1	9.7	5.3

Create a stem and leaf diagram using the integer as the stem and the decimal as the leaf.

- Store the data in the List (L2)
- Sort L2 ascending order

Shapes of Stem and Leaf plots

Example : STA1013 Test Result

Symmetric Data

2		8				
3		7	9			
4		3	6			
5		0	1	7	8	
6		1	1	2	5	7
7		2	3	5	7	
8		0	1			
9		3	4			
10		0				

Left Skewed Data

2		8				
3						
4		5				
5		0				
6		1	2			
7		2	3	5		
8		0	1	2	8	9
9		3	4	5	6	8
10		0	0			

Right Skewed Data

2		9	9			
3		1	2	8	9	
4		2	3	5	6	5
5		0	1	3	4	
6		1	2			
7		2				
8		0				
9		3				
10		0				

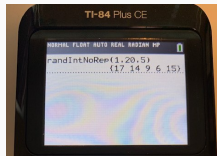
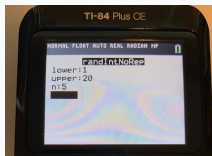
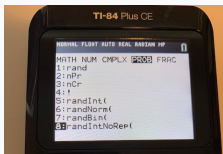
- **Symmetric** : Bell shape
- **Left skew** :
 - Lots of high scores and has performed very well or the Exam was easy
 - Small number of students who have done poorly, which makes the plot stretch out to Left (see after rotate 90 degree)
 - Going to the Left is Negative : **Negative skew**
- **Right skew** :
 - Lots of low scores and has not performed well or the Exam was difficult
 - Small number of students who have done well, which makes the plot stretch out to Right (see after rotate 90 degree)
 - Going to the Right is Positive : **Positive skew**

Random number generator & Sequence generator

#	1	2	3	4	5	6	7	8	9	10
Obs	3.5	4.1	5.4	4.6	9.3	2.7	3.5	6.3	5.1	8.3
#	11	12	13	14	15	16	17	18	19	20
Obs	4.4	5.3	6.7	4.6	2.8	8.8	1.5	3.9	7.2	5.8

Simple Random Sample

- Need a random number generator
- `math` → `PROB` (▷ 4times) → **8:randIntNoRep**
→ lower : 1, upper : 20, n : 5, Paste + `enter` x2

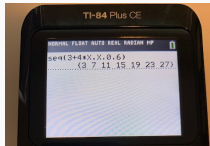
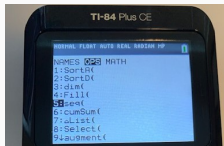


$$\bar{X} = \frac{1.5 + 4.6 + 5.1 + 2.7 + 2.8}{5} = 3.34$$

Random number generator & Sequence generator

Systematic Sample (start from 3 every 4th observation)

- Need a sequence generator
- `list` (press `2nd` + `stat`) → OPS → `5:seq` + `enter`
→ Expr : $3 + 4 * X$, Variable : X , start : 0, end : 4, Paste + `enter` x2



$$\bar{X} = \frac{5.4 + 3.5 + 4.4 + 2.8 + 7.2}{5} = 4.66$$

Suppose our population size is 200.

1. Draw Simple Random Sample **size 20**
2. Draw Systematic sample **start from 7 every 9th observation**

The above two will give us indices.

1st Quiz :

- **September 13 (Fri)**
- You can use your calculator
- Bring one piece of hand written cheat sheet (both side allowed)
- Topics : **Lecture note 1 ~ Lecture note 5**
 - Exercises and Examples in the Lecture notes
 - Practice Problems (Will be posted on canvas)