

■ 1-Sample Z Interval

Set Up

- 1. On the icon menu, select STAT2.

Execution

- 2. When using list data (List is selected as the Data parameter), be sure to input data into the list first.
3. **F4**(INTR) **1**(Z) **1**(1-Smpl)... 1-Sample Z Interval
4. Set calculation parameters.
5. Align the cursor with [Execute]
F1(CALC) ... Performs calculation.

• • • • •

Example In a random sample of size $n = 20$ from a normal population with the standard deviation $\sigma = 15$ and the mean $\bar{x} = 64.3$, construct a 95% confidence interval for the population mean μ .

Procedure

- ① **MENU** STAT2
- ② **F4** (INTR) **1** (Z) **1** (1-Smpl)
- ③ **F2** (VAR) **▼**
• **9** **5** **EXE**
1 **5** **EXE**
6 **4** **•** **3** **EXE**
2 **0** **EXE**
F1 (None) **▼**
- ④ **F1** (CALC)

```
1-Sample ZInterval
C-Level :0.95      ↑
σ       :15
x̄       :64.3
n       :20
Save Res:None
Execute
CALC
```

Result Screen

```
1-Sample ZInterval
Left =57.7260809
Right=70.8739191
x̄    =64.3
n    =20
```

Thus, the 95% confidence interval for μ becomes $57.7 < \mu < 70.9$.

■ 2-Sample Z Interval

Set Up

- 1. On the icon menu, select STAT2.

Execution

2. When using list data (List is selected as Data parameter), be sure to input data into the list first.
3. **F4** (INTR) **F1** (Z) **F2** (2-Smpl)... 2-Sample Z Interval
4. Set calculation parameters.
5. Align the cursor with [Execute]
F1 (CALC) ... Performs calculation.

• • • • •

Example Construct a 94% confidence interval for the difference between the mean lifetimes of two kinds of light bulbs ($\mu_1 - \mu_2$), given that random sample of 40 light bulbs of the first kind lasted on the average for 418 hours of continuous use and 50 light bulbs of the second kind lasted on the average for 402 hours of continuous use. The population standard deviations are known to be $\sigma_1 = 26$ and $\sigma_2 = 22$.

Procedure

- ① **MENU** STAT2
- ② **F4** (INTR) **1** (Z) **2** (2-Smpl)
- ③ **F2** (VAR) **▼**
 - **9** **4** **EXE**
 - 2** **6** **EXE**
 - 2** **2** **EXE**
 - 4** **1** **8** **EXE**
 - 4** **0** **EXE**
 - 4** **0** **2** **EXE**
 - 5** **0** **EXE**
 - F1** (None) **▼**
- ④ **F1** (CALC)

```
2-Sample ZInterval
x1      :418      ↑
n1      :40
x2      :402
n2      :50
Save Res:None
Execute
CALC
```

Result Screen

```
2-Sample ZInterval
Left =6.30341903
Right=25.696581
x1     =418
x2     =402
n1     =40
n2     =50
```

Thus, the 94% confidence interval for $\mu_1 - \mu_2$ becomes $6.3 < \mu_1 - \mu_2 < 25.7$.

■ 1-Prop Z Interval

Set Up

- 1. On the icon menu, select STAT2.

Execution

2. **F4**(INTR) **1**(Z) **3**(1-Prop)... 1-Prop Z Interval
3. Set calculation parameters.
4. Align the cursor with [Execute]
F1(CALC) ... Performs calculation.

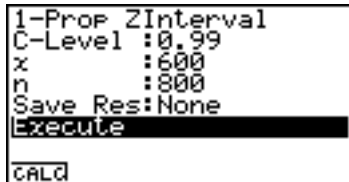
• • • • •
Example

Suppose 800 students were selected at random from a student body of 20,000 and given shots to prevent a certain type of flu. All 800 students were exposed to the flu and 600 of them did not get the flu. Let p present the probability that the shot will be successful for any single student selected at random from the entire population of 20,000. Let q be the probability that the shot is not successful.

- What are the point estimates for p and q ?
- Find a 99% confidence interval for p .

Procedure

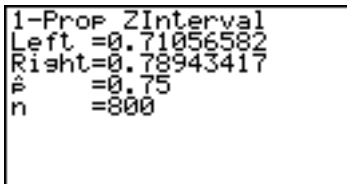
- MENU** STAT2
- F4** (INTR) **1** (Z) **3** (1-Prop)
- **9** **9** **EXE**
6 **0** **0** **EXE**
8 **0** **0** **EXE**
F1 (None) **▼**
- F1** (CALC)



```

1-Prop ZInterval
C-Level :0.99
x       :600
n       :800
Save Res:None
Execute
CALC
  
```

Result Screen



```

1-Prop ZInterval
Left =0.71056582
Right=0.78943417
p-hat =0.75
n      =800
  
```

- The point estimates for $p = 0.75$, and the point estimates for $q = 1 - p = 0.25$.
- Thus, the 99% confidence interval for p becomes $0.71 < p < 0.79$.

■ 2-Prop Z Interval

Set Up

- 1. On the icon menu, select STAT2.

Execution

- 2. **F4**(INTR) **1**(Z) **4**(2-Prop)... 2-Prop Z Interval
- 3. Set calculation parameters.
- 4. Align the cursor with [Execute]
F1(CALC) ... Performs calculation.

• • • • •

Example If 132 of 200 male voters and 90 of 150 female voters favor a certain candidate running for governor of Texas, find a 99% confidence interval for the difference between the actual proportions of male and female voters who favor the candidate.

Procedure

- ① **MENU** STAT2
- ② **F4** (INTR) **1** (Z) **4** (2-Prop)
- ③ **•** **9** **9** **EXE**
1 **3** **2** **EXE**
2 **0** **0** **EXE**
9 **0** **EXE**
1 **5** **0** **EXE**
F1 (None) **▼**
- ④ **F1** (CALC)

```
2-Prop ZInterval
x1      :132
n1      :200
x2      :90
n2      :150
Save Res:None
Execute
CALC
```

Result Screen

```
2-Prop ZInterval
Left = -0.0743882
Right = 0.1943882
p1     = 0.66
p2     = 0.6
n1     = 200
n2     = 150
```

Let p_1 the actual propotion of male voters who favor the candidate.
 Let p_2 the actual propotion of female voters who favor the candidate.
 Thus, the 99% confidence interval for $(p_1 - p_2)$ is $-0.074 < p_1 - p_2 < 0.194$.

■ 1-Sample t Interval

Set Up

- 1. On the icon menu, select STAT2.

Execution

- 2. When using list data (List is selected as Data parameter), be sure to input data into the list first.
- 3. **F4**(INTR) **2**(T) **1**(1-Smpl)... 1-Sample t Interval
- 4. Set calculation parameters.
- 5. Align the cursor with [Execute]
F1(CALC) ... Performs calculation.

• • • • •

Example

A paint manufacture wants to determine the average drying time of a new interior wall paint. If for 12 test areas of equal size he obtained a mean drying time of 66.3 minutes and a standard deviation of 8.4 minutes, construct a 95% confidence interval for the population mean μ .

Procedure

- ① **MENU** STAT2
- ② **F4** (INTR) **2** (T) **1** (1-Smpl)
- ③ **F2** (VAR) **▼**
 - **9** **5** **EXE**
 - 6** **6** **•** **3** **EXE**
 - 8** **•** **4** **EXE**
 - 1** **2** **EXE**
 - F1** (None) **▼**
- ④ **F1** (CALC)

```

1-Sample tInterval
C-Level : 0.95      ↑
x̄          : 66.3
s/√n-1     : 8.4
n          : 12
Save Res: None
Execute
CALC
  
```

Result Screen

```

1-Sample tInterval
Left = 60.9628946
Right = 71.6371054
x̄      = 66.3
s/√n-1 = 8.4
n      = 12
  
```

Thus, the 95% confidence interval for μ becomes $61.0 < \mu < 71.6$.

■ 2-Sample t Interval (Pooled On)

Set Up

1. On the icon menu, select STAT2.

Execution

2. When using list data (List is selected as the Data parameter), be sure to input data into the list first.
3. **F4** (INTR) **2** (T) **2** (2-Smpl) ... 2-Sample t Interval
4. Set calculation parameters.
5. Align the cursor with [Execute]
- F1** (CALC) ... Performs calculation.

• • • • •

Example Factory A and Factory B both manufacture the same item. To compare the productivity of the two factories, the production data shown below was collected for 10 items at Factory A and nine items at Factory B.

Factory A: 78, 80, 79, 83, 82, 85, 78, 74, 76, 84 (kg/h)

Factory B: 81, 84, 82, 88, 86, 83, 78, 84, 89 (kg/h)

Construct a 95% confidence interval for the difference between μ_1 and μ_2 when the following is assumed: $\sigma_1^2 = \sigma_2^2$, Factory A population distribution is $N(\mu_1, \sigma_1^2)$, and Factory B population distribution is $N(\mu_2, \sigma_2^2)$.

Procedure

① **MENU** STAT2

② **7** **8** **EXE** **8** **0** **EXE** **7** **9** **EXE** **8** **3** **EXE** **8** **2** **EXE**
8 **5** **EXE** **7** **8** **EXE** **7** **4** **EXE** **7** **6** **EXE** **8** **4** **EXE**
▶
8 **1** **EXE** **8** **4** **EXE** **8** **2** **EXE** **8** **8** **EXE** **8** **6** **EXE**
8 **3** **EXE** **7** **8** **EXE** **8** **4** **EXE** **8** **9** **EXE**

③ **F4** (INTR) **2** (T) **2** (2-Smpl)

④ **F1** (LIST) **▼**
◀ **9** **5** **EXE**
F1 (LIST) **1** **EXE** **▼**
F1 (LIST) **2** **EXE** **▼**
F1 (1) **▼**
F1 (1) **▼**
F1 (On) **▼**
F1 (None) **▼**

⑤ **F1** (CALC)

	List 1	List 2	List 3	List 4
6	85	83		
7	78	78		
8	74	84		
9	76	89		
10	84			

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```

2-Sample tInterval
List(2) : List2      ↑
Freq(1) : 1
Freq(2) : 1
Pooled  : On
Save Res: None
Execute
CALC
  
```

Result Screen

```

2-Sample tInterval
Left = -7.3942786
Right = -0.5834991
df      = 17
x1      = 79.9
x2      = 83.8888889
x1σn-1 = 3.57304725  ↓
  
```

Thus, the 95% confidence interval for $\mu_1 - \mu_2$ becomes $-7.4 < \mu_1 - \mu_2 < -0.6$.

■ 2-Sample t Interval (Pooled Off)

Set Up

1. On the icon menu, select STAT2.

Execution

2. When using list data (List is selected as the Data parameter), be sure to input data into the list first.
3. **F4**(INTR) **2**(T) **2**(2-Smpl) ... 2-Sample t Interval
4. Set calculation parameters.
5. Align the cursor with [Execute]
F1(CALC) ... Performs calculation.

• • • • •

Example Factory A and Factory B both manufacture the same item. To compare the productivity of the two factories, the production data shown below was collected for 10 items at Factory A and nine items at Factory B.

Factory A: 78, 80, 79, 83, 82, 85, 78, 74, 76, 84 (kg/h)

Factory B: 81, 84, 82, 88, 86, 83, 78, 84, 89 (kg/h)

Construct a 95% confidence interval for the difference between μ_1 and μ_2 when the following is assumed: $\sigma_1^2 = \sigma_2^2$ is uncertain, Factory A population distribution is $N(\mu_1, \sigma_1^2)$, and Factory B population distribution is $N(\mu_2, \sigma_2^2)$.

Procedure

- ① **MENU** STAT2
- ② **7** **8** **EXE** **8** **0** **EXE** **7** **9** **EXE** **8** **3** **EXE** **8** **2** **EXE**
8 **5** **EXE** **7** **8** **EXE** **7** **4** **EXE** **7** **6** **EXE** **8** **4** **EXE**
▶
8 **1** **EXE** **8** **4** **EXE** **8** **2** **EXE** **8** **8** **EXE** **8** **6** **EXE**
8 **3** **EXE** **7** **8** **EXE** **8** **4** **EXE** **8** **9** **EXE**
- ③ **F4** (INTR) **2** (T) **2** (2-Smpl)
- ④ **F1** (LIST) **▼**
◀ **9** **5** **EXE**
F1 (LIST) **1** **EXE** **▼**
F1 (LIST) **2** **EXE** **▼**
F1 (1) **▼**
F1 (1) **▼**
F2 (Off) **▼**
F1 (None) **▼**
- ④ **F1** (CALC)

```
2-Sample tInterval
List(2):List2      ↑
Freq(1):1
Freq(2):1
Pooled:Off
Save Res:None
Execute
CALC
```

Result Screen

```
2-Sample tInterval
Left = -7.3887594
Right = -0.5890183
df = 16.9052984
x1 = 79.9
x2 = 83.8888889
x1σn-1 = 3.57304725 ↓
```

Thus, the 95% confidence interval for $\mu_1 - \mu_2$ becomes $-7.4 < \mu_1 - \mu_2 < -0.6$.