

Chapter 2 / Example 3

Measures of dispersion

The number of days of precipitation in January in London for 2008–2017 is given in the table:

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Days of precipitation	19	16	21	21	13	21	30	26	21	15

(data from weatherline.co.uk)

- Write down the range of the number of days of precipitation in January in London for these years.
- Calculate the interquartile range of the number of days of precipitation in January in London for these years.
- Find the standard deviation of the number of days of precipitation in January in London for these years.
- Find whether the 30 cm precipitation in January 2014 is an outlier.

Press **[STAT]** 1:Edit and press **[ENTER]**

Type 19, 16, 21, ... 15 in the first column.

Press **[ENTER]** or **[↓]** after each number to move to the next cell.

Note: If the list contains other numbers, you can clear it by pressing **[STAT]** 4:ClrList and press **[ENTER]**. The home screen displays ClrList. Press **[2nd]** **[1]** **[L1]** and press **[ENTER]**. Press **[STAT]** 1:Edit and press **[ENTER]** to return to the table.

L1	L2	L3	L4	L5	1
19					
16					
21					
21					
13					
21					
30					
26					
21					
15					

L1(11)=					

To calculate a statistical summary of the data

Press **[STAT]** and **[▶]** to access the CALC menu.

Select 1:1-Var Stats and press **[ENTER]**.

Leave FreqList empty.

Navigate to Calculate and press **[ENTER]**.

1-Var Stats
List:L1
FreqList:
Calculate

Scroll down using **[↓]**.

The table of statistics shows that the minimum is 13 and the maximum is 30.

1-Var Stats
↑Sx=5.056349144
σx=4.796873982
n=10
minX=13
Q1=16
Med=21
Q3=21
maxX=30

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Press **2nd** **[QUIT]** to enter the home screen.

Press **[VAR]** 5:Statistics...

The statistics that you calculated earlier are all stored as variables.

```

XY Σ EQ TEST PTS
1:n
2:x̄
3:Sx
4:σx
5:y
6:Sy
7:σy
8:minX
9↓maxX

```

To calculate the range Use Range = maxX – minX.

Select 8:maxX and 9:minX from the list to enter the calculation.

The range is 17.

```

maxX-minX
.....17

```

Press **[VAR]** 5:Statistics... and use **[▶]** to navigate to PTS.

The statistics that you calculated earlier are all stored as variables.

```

XY Σ EQ TEST PTS
1:1x1
2:y1
3:x2
4:y2
5:x3
6:y3
7:Q1
8:Med
9:Q3

```

To calculate the interquartile range Use IQR = $Q_3 - Q_1$.

Select 9:Q₃ and 7:Q₁ from the list to enter the calculation.

The inter quartile range is 5.

```

maxX-minX
.....17
Q3-Q1
.....5

```

Press **[VAR]** 5:Statistics... and select 4:σx, the standard deviation, from the list of stored variables.

The standard deviation is 4.80 days.

```

maxX-minX
.....17
Q3-Q1
.....5
σx
.....4.796873982

```

To determine whether 30 is an outlier use $Q_3 + 1.5(IQR)$

Select Q₃ and Q₁ from the list to enter the calculation

$Q_3 + 1.5 (Q_3 - Q_1)$.

$30 < 28.5$, so 30 is an outlier.

```

maxX-minX
.....17
Q3-Q1
.....5
σx
.....4.796873982
Q3+1.5(Q3-Q1)
.....28.5

```