

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 **MENU** 2 **STRG** to display the List Editor screen.

Type the numbers 19, 16, 21, ... 15 in the first column. Press **EXE** after each number to move to the next cell.

Note: If the list contains other numbers, you can clear it by pressing **F4** DEL-ALL.

| | List 1 | List 2 | List 3 | List 4 |
|-----|--------|--------|--------|--------|
| SUB | | | | |
| 1 | 19 | | | |
| 2 | 16 | | | |
| 3 | 21 | | | |
| 4 | 21 | | | |
| | | | | 21 |
| | | | | |

GRAPH CALC TEST INTR DIST **▶**

To calculate statistics for this dataset

Press **F2** CALC.

Press **F6** SET.

1Var XList should be List1 and 1Var Freq should be 1.

Press **EXIT** **◻**

| | |
|-------------|--------|
| 1Var XList | :List1 |
| 1Var Freq | :1 |
| 2Var XList | :List1 |
| 2Var YList | :List2 |
| 2Var Freq | :1 |
| LIST | |

Press **F1** 1-VAR.

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

| | |
|-------------------|-----|
| 1-Variable | |
| n | =10 |
| minX | =13 |
| Q1 | =16 |
| Med | =21 |
| Q3 | =21 |
| maxX | =30 |

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Press **MENU** 1 **RUN-MAT** to display the Run-Matrix screen for arithmetical calculations.

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

To calculate the range Use $\text{Range} = \text{maxX} - \text{minX}$.

Press **VAR** **F3** STAT **F1** X **F6** \triangleright **F3** **maxX**.

= **F2** **minx** and press **EXE**.

```
maxX-minX
17
[ ]
sx | minX | maxX
```

To calculate the interquartile range Use $\text{IQR} = Q_3 - Q_1$.

Press **EXIT** **F3** GRAPH **F6** \triangleright **F6** \triangleright **F1** **Q3**.

= **F6** \triangleright **F6** \triangleright **F4** **Q1** and press **EXE**.

The inter quartile range is 5.

```
maxX-minX
17
Q3-Q1
5
[ ]
r | r^2 | MSe | Q1 | Med
```

To retrieve the standard deviation press **EXIT** **F1** X **F5** σx and press **EXE**.

The standard deviation is 4.80 days.

```
maxX-minX
17
Q3-Q1
5
σx
4.796873982
[ ]
n | x̄ | Σx | Σx^2 | σx
```

To determine whether 30 is an outlier use $Q_3 + 1.5(\text{IQR})$

Select Q_3 and Q_1 from the list to enter the calculation

$Q_3 + 1.5 (Q_3 - Q_1)$.

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

```
Q3-Q1
5
σx
4.796873982
Q3+1.5(Q3-Q1)
28.5
[ ]
r | r^2 | MSe | Q1 | Med
```