# A Level Mathematics
# Statistics pre-course work

Here in the Verulam Maths department, we want you to be as successful as possible in your A Level studies. The A Level builds on the work you did at GCSE, and we will expect you to be confident in your GCSE skills and topics as we begin the A Level course.

We know that you will be more successful if we do not have to re-teach these skills, as this means we spend longer on the new material.

Therefore you are expected to complete this booklet in full and hand in to your maths teacher in your first maths lesson in September. Failure to complete this homework to an acceptable standard may affect you beginning the course.

## Contents

| Name: | |
|---|---|
| Maths block: | |
| Received By teacher on: | |

## Large Data Set

All A Level exam boards are obligated to provide a 'large data set'. Data in exam questions will often be from this set, and for this exercise you will explore this data (which is publicly available) in Microsoft Excel.

It is important to note that you are expected to be familiar with this data set for the statistics part of the course, including some basic geographic knowledge! So for some of these you will need to use a search engine to investigate.

### Dates

We are provided with weather readings in two years for all locations: _____.and _____..

In both years, data is only provided from _____.to _____. This is a period

of _____.days.

### UK Locations

There are five UK locations, and three international locations where weather data has been taken.

Complete this information from the northern-most UK location to the southernmost UK location.

**UK location 1**: _____ is in the county of _____. It is a small town, located

7 miles from the city of _____. The weather station is likely to be here because of the former RAF base.

**UK location 2**: _____ is in the county of _____. It is a village, located to

the east of _____ National Park and to the west of _____ National Park. There is an operational RAF base in the village, and this is the likely location of the weather station.

**UK location 3**: _____ is an international airport located _____ miles to

the _____ of Central London. It is in the London Borough of _____.

**UK location 4**: _____ is in the county of _____. It is the nearest village to

_____ Airport.

**UK location 5**: _____ is in the county of _____. It has a population of more than 20,000 and used to the richest mining area in the world. They used to mine

predominantly _____, but also _____.

Data Units for UK data

Complete the table below:

|  | Units | Rounding accuracy (to the nearest…) | Continuous, discrete or qualitative |
|---|---|---|---|
| Daily mean temperature (measured from 9am GMT) |  |  |  |
| Daily total rainfall (measured from 9am GMT) |  |  |  |
| Daily total sunshine (measured from midnight GMT) |  |  |  |
| Daily mean windspeed (1) (measured from midnight GMT) |  |  |  |
| Daily mean windspeed (2) (measured from midnight GMT) |  |  |  |
| Daily maximum gust (measured from midnight GMT) |  |  |  |
| Daily maximum relative humidity (measured from midnight GMT) |  |  |  |
| Daily mean total cloud |  |  |  |
| Daily mean visibility |  |  |  |
| Daily mean pressure |  |  |  |
| Daily mean wind direction (1) |  |  |  |
| Cardinal direction (of daily mean wind direction) |  |  |  |
| Daily Max gust corresponding direction |  |  |  |
| Cardinal direction (of daily Max gust corresponding direction) |  |  |  |

## Questions on the data types

What is the conversion rate between knots and mph?

_____

What is the conversion rate between hPa and millibars?

_____

How is snow and hail recorded?

_____

_____

For temperature, rainfall, sunshine, wind and relative humidity, what does "n/a" mean, and how should we treat this when analysing data (data cleaning)?

_____

_____

_____

What is a relative humidity of more than 95% likely to represent?

_____

For visibility, what does a "-" mean?

_____

For rainfall, what does "tr" mean, and how should we treat this when analysing data (data cleaning)?

_____

_____

_____

## Data ranges

It helps to have a rough idea of the upper and lower limits of the data for each location. Complete the tables below (round temperature to nearest 0.1° and pressure to nearest whole hPa):

### Camborne

|  | Mean daily temperature | | Mean daily wind speed | | Mean daily pressure | |
|---|---|---|---|---|---|---|
|  | Min | Max | Min | Max | Min | Max |
| May 1987 |  |  |  |  |  |  |
| June 1987 |  |  |  |  |  |  |
| July 1987 |  |  |  |  |  |  |
| August 1987 |  |  |  |  |  |  |
| September 1987 |  |  |  |  |  |  |
| October 1987 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| May 2015 |  |  |  |  |  |  |
| June 2015 |  |  |  |  |  |  |
| July 2015 |  |  |  |  |  |  |
| August 2015 |  |  |  |  |  |  |
| September 2015 |  |  |  |  |  |  |
| October 2015 |  |  |  |  |  |  |

### Hurn

|  | Mean daily temperature | | Mean daily wind speed | | Mean daily pressure | |
|---|---|---|---|---|---|---|
|  | Min | Max | Min | Max | Min | Max |
| May 1987 |  |  |  |  |  |  |
| June 1987 |  |  |  |  |  |  |
| July 1987 |  |  |  |  |  |  |
| August 1987 |  |  |  |  |  |  |
| September 1987 |  |  |  |  |  |  |
| October 1987 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| May 2015 |  |  |  |  |  |  |
| June 2015 |  |  |  |  |  |  |
| July 2015 |  |  |  |  |  |  |
| August 2015 |  |  |  |  |  |  |
| September 2015 |  |  |  |  |  |  |
| October 2015 |  |  |  |  |  |  |

Heathrow

|  | Mean daily temperature | | Mean daily wind speed | | Mean daily pressure | |
|---|---|---|---|---|---|---|
|  | Min | Max | Min | Max | Min | Max |
| May 1987 |  |  |  |  |  |  |
| June 1987 |  |  |  |  |  |  |
| July 1987 |  |  |  |  |  |  |
| August 1987 |  |  |  |  |  |  |
| September 1987 |  |  |  |  |  |  |
| October 1987 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| May 2015 |  |  |  |  |  |  |
| June 2015 |  |  |  |  |  |  |
| July 2015 |  |  |  |  |  |  |
| August 2015 |  |  |  |  |  |  |
| September 2015 |  |  |  |  |  |  |
| October 2015 |  |  |  |  |  |  |

Leeming

|  | Mean daily temperature | | Mean daily wind speed | | Mean daily pressure | |
|---|---|---|---|---|---|---|
|  | Min | Max | Min | Max | Min | Max |
| May 1987 |  |  |  |  |  |  |
| June 1987 |  |  |  |  |  |  |
| July 1987 |  |  |  |  |  |  |
| August 1987 |  |  |  |  |  |  |
| September 1987 |  |  |  |  |  |  |
| October 1987 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| May 2015 |  |  |  |  |  |  |
| June 2015 |  |  |  |  |  |  |
| July 2015 |  |  |  |  |  |  |
| August 2015 |  |  |  |  |  |  |
| September 2015 |  |  |  |  |  |  |
| October 2015 |  |  |  |  |  |  |

Leuchars

| | Mean daily temperature | | Mean daily wind speed | | Mean daily pressure | |
|---|---|---|---|---|---|---|
| | Min | Max | Min | Max | Min | Max |
| May 1987 | | | | | | |
| June 1987 | | | | | | |
| July 1987 | | | | | | |
| August 1987 | | | | | | |
| September 1987 | | | | | | |
| October 1987 | | | | | | |
| | | | | | | |
| May 2015 | | | | | | |
| June 2015 | | | | | | |
| July 2015 | | | | | | |
| August 2015 | | | | | | |
| September 2015 | | | | | | |
| October 2015 | | | | | | |

Complete the following for the UK locations:

The location with the **highest** mean daily temperature was _____., recorded in

_____ (month) _____ (year).

The location with the **lowest** mean daily temperature was _____., recorded in

_____ (month) _____ (year).

The location with the **highest** mean daily wind speed was _____., recorded in

_____ (month) _____ (year).

The location with the **lowest** mean daily wind speed was _____., recorded in

_____ (month) _____ (year).

The location with the **highest** mean daily pressure was _____., recorded in

_____ (month) _____ (year).

The location with the **lowest** mean daily pressure was _____., recorded in

_____ (month) _____ (year).

## International Locations

Complete this information from the western-most international location to the eastern-most international location.

**International location 1**: _____ is in the US state of _____, where it is the

most populous city. It is a coastal city, on the coast of _____. The humid

subtropical climate means there is a 'wet' season between _____ and _____.


**International location 2**: _____ is the capital city of _____.and home to

the _____(year) Olympic Games. It is not on the coast, and the weather station has an

elevation of _____m. Air pollution has changed average summer temperatures by 3 degrees in the
last 50 years. The monsoon-influenced humid continental climate means that ¾ of average annual

rainfall      occurs      between      _____      and      _____.

**International location 3**: _____ is in the Australian state of _____

and is the _____ largest city in Australia. It was named after a city in _____. It is the

only set of data we use for a city in the _____ hemisphere. It has a hot-summer

Mediterranean climate, and most rain falls in the winter months of _____ to _____.

## Data Units for International data

Complete the table below:

|  | Units | Rounding accuracy (to the nearest…) | Continuous, discrete or qualitative |
|---|---|---|---|
| Daily mean air temperature |  |  |  |
| Rainfall (24 hour total) |  |  |  |
| Daily mean pressure (hPa) |  |  |  |
| Daily mean windspeed (1) |  |  |  |
| Daily mean windspeed (2) |  |  |  |

## Data ranges

It helps to have a rough idea of the upper and lower limits of the data for each location. Complete the tables below (round temperature/wind speed to nearest 0.1 and pressure to nearest whole hPa):

### Jacksonville

|                | Mean daily temperature | | Mean daily wind speed | | Mean daily pressure | |
| --- | --- | --- | --- | --- | --- | --- |
|                | Min | Max | Min | Max | Min | Max |
| May 1987       |     |     |     |     |     |     |
| June 1987      |     |     |     |     |     |     |
| July 1987      |     |     |     |     |     |     |
| August 1987    |     |     |     |     |     |     |
| September 1987 |     |     |     |     |     |     |
| October 1987   |     |     |     |     |     |     |
|                |     |     |     |     |     |     |
| May 2015       |     |     |     |     |     |     |
| June 2015      |     |     |     |     |     |     |
| July 2015      |     |     |     |     |     |     |
| August 2015    |     |     |     |     |     |     |
| September 2015 |     |     |     |     |     |     |
| October 2015   |     |     |     |     |     |     |

### Beijing

|                | Mean daily temperature | | Mean daily wind speed | | Mean daily pressure | |
| --- | --- | --- | --- | --- | --- | --- |
|                | Min | Max | Min | Max | Min | Max |
| May 1987       |     |     |     |     |     |     |
| June 1987      |     |     |     |     |     |     |
| July 1987      |     |     |     |     |     |     |
| August 1987    |     |     |     |     |     |     |
| September 1987 |     |     |     |     |     |     |
| October 1987   |     |     |     |     |     |     |
|                |     |     |     |     |     |     |
| May 2015       |     |     |     |     |     |     |
| June 2015      |     |     |     |     |     |     |
| July 2015      |     |     |     |     |     |     |
| August 2015    |     |     |     |     |     |     |
| September 2015 |     |     |     |     |     |     |
| October 2015   |     |     |     |     |     |     |

Perth

| | Mean daily temperature | | Mean daily wind speed | | Mean daily pressure | |
|---|---|---|---|---|---|---|
| | Min | Max | Min | Max | Min | Max |
| May 1987 | | | | | | |
| June 1987 | | | | | | |
| July 1987 | | | | | | |
| August 1987 | | | | | | |
| September 1987 | | | | | | |
| October 1987 | | | | | | |
| | | | | | | |
| May 2015 | | | | | | |
| June 2015 | | | | | | |
| July 2015 | | | | | | |
| August 2015 | | | | | | |
| September 2015 | | | | | | |
| October 2015 | | | | | | |

## Complete the following for the international locations:

The location with the **highest** mean daily temperature was _____., recorded in

_____ (month) _____ (year).

The location with the **lowest** mean daily temperature was _____., recorded in

_____ (month) _____ (year).

The location with the **highest** mean daily wind speed was _____., recorded in

_____ (month) _____ (year).

The location with the **lowest** mean daily wind speed was _____., recorded in

_____ (month) and _____ (month) _____ (year).

The location with the **highest** mean daily pressure was _____., recorded in

_____ (month) _____ (year).

The location with the **lowest** mean daily pressure was _____., recorded in

_____ (month)._____ (year).

## Other extremes

Finally, looking at all the find, find the maximum and minimum values for these other variables. Where there is a (1) and (2), there are two joint equal maxima/minima – try to find them both.

|  | Minimum | Date | Location | Maximum | Date (d/m/y) | Location |
|---|---|---|---|---|---|---|
| UK rainfall (mm) |  |  |  |  |  |  |
| International rainfall (mm) |  |  |  |  |  |  |
| UK sunshine hour (1) |  |  |  |  |  |  |
| UK sunshine hour (2) |  |  |  |  |  |  |
| UK maximum gust |  |  |  |  |  |  |
| UK relative humidity (%) |  |  |  |  |  |  |
| Visibility (Dm) (1) |  |  |  |  |  |  |
| Visibility (Dm) (2) |  |  |  |  |  |  |

According to the Beaufort scale, the strongest average wind described was _____, and

the majority of wind speeds were described as _____.or _____.

References

Beaufort conversion chart

Here is the official Beaufort scale conversions from the Met Office website. For the purpose of our data set, the ones marked * have been simplified by Edexcel to 'light'.

| Beaufort wind scale | Wind Speed (knots) | Wind descriptive terms |
|---|---|---|
| 0 | <1 | Calm |
| 1 | 1-3 | Light air (*) |
| 2 | 4-6 | Light breeze (*) |
| 3 | 7-10 | Gentle breeze (*) |
| 4 | 11-16 | Moderate breeze |
| 5 | 17-21 | Fresh breeze |
| 6 | 22-27 | Strong breeze |
| 7 | 28-33 | Near gale |
| 8 | 34-40 | Gale |
| 9 | 41-47 | Strong gale* |
| 10 | 48-55 | Storm |
| 11 | 56-63 | Violent storm |
| 12 | 64+ | Hurricane |

How we measure cloud amount (from the Met Office website)

At any time different types of cloud at different heights above the ground may be visible from an observing station. Total cloud amount is the fraction of the sky covered by cloud of any type or height above the ground. Cloud amount is reported in oktas or eighths with the additional convention that:

- 0 oktas represents the complete absence of cloud
- 1 okta represents a cloud amount of 1 eighth or less, but not zero
- 7 oktas represents a cloud amount of 7 eighths or more, but not full cloud cover
- 8 oktas represents full cloud cover with no breaks
- 9 oktas represents sky obscured by fog or other meteorological phenomena

Total cloud amount is only reported from stations where the human observer is present.