A dark, semi-transparent background image of a science laboratory. Several students are visible, some using microscopes. The scene is dimly lit, with the primary light source being the text overlay.

GRADE 12 MATHEMATICS STATISTICS

MEASURES OF CENTRAL TENDENCY(AVERAGES)

1. MEAN

THE AVERAGE VALUE OF THE DATA SET

$$\bar{x} = \frac{\sum x}{n}$$

MEAN IS THE SUM OF ALL THE NUMBERS DIVIDED BY THE NUMBER OF NUMBERS

2. MEDIAN

THE MIDDLE VALUE OF THE ORDERED DATA SET

3. MODE

THE DATA VALUE THAT OCCURS MOST FREQUENTLY

MEASURES OF SPREAD

1. RANGE

= *Highest data value* – *Lowest data value*

2. INTER-QUARTILE RANGE

$$IQR = Q_3 - Q_1$$

3. STANDARD DEVIATION

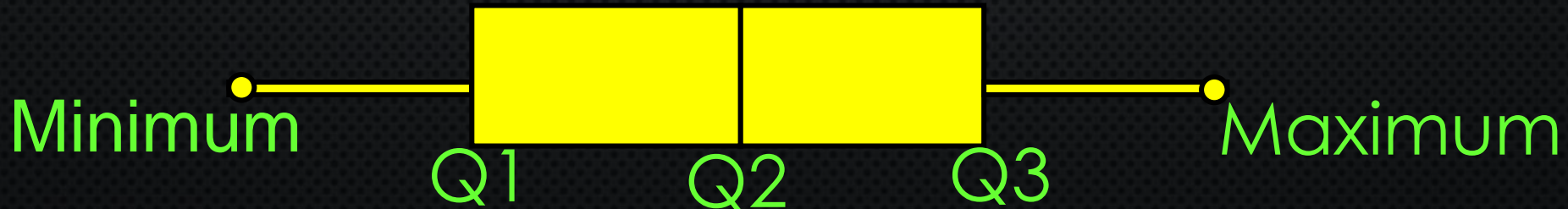
$$\sigma = \sqrt{\frac{\sum(x-\bar{x})^2}{n}}$$

← CAN BE DONE ON CALCULATOR

DISTRIBUTION OF DATA

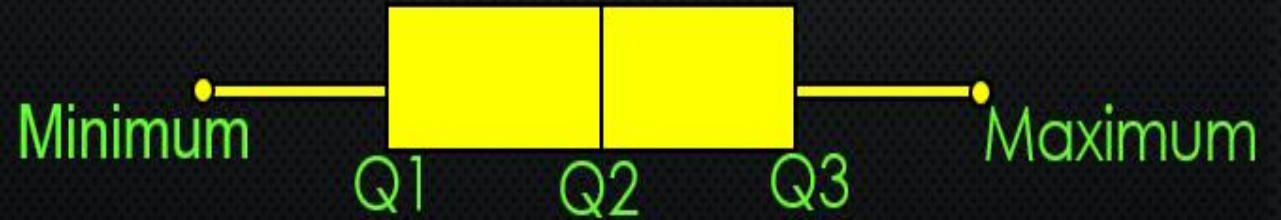
1. SYMMETRICAL DISTRIBUTION

- IN A **BOX-AND-WHISKER PLOT**, SYMMETRICAL DISTRIBUTION CAN BE SEEN WHEN **Q2 IS IN THE MIDDLE OF Q1 AND Q3**
- **Q1 – QUARTILE 1 (VALUE BETWEEN MINIMUM AND MEDIAN)**
- **Q2 – QUARTILE 2 (MEDIAN)**
- **Q3 – QUARTILE 3 (VALUE BETWEEN MEDIAN AND MAXIMUM)**



FIVE – NUMBER SUMMARY FOR BOX AND WHISKER PLOT

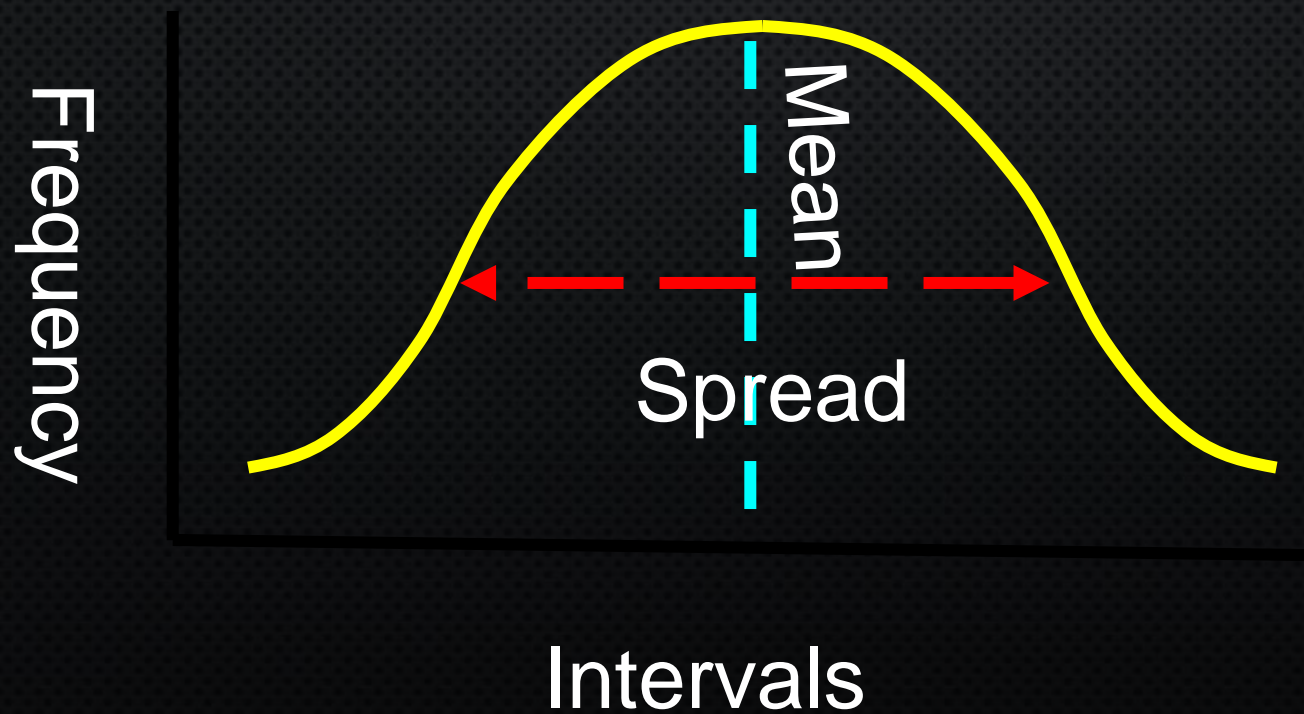
1. MINIMUM DATA VALUE
2. LOWER QUARTILE (Q1)
3. MEDIAN (Q2)
4. UPPER QUARTILE (Q3)
5. MAXIMUM DATA VALUE



DISPLAYED BY MEANS OF THE BOX-AND-WHISKER PLOT, WHICH IN TURN IS A VISUAL REPRESENTATION OF THE DISTRIBUTION OF THE DATA!

IN A **DISTRIBUTION CURVE**, NORMAL DISTRIBUTION CAN BE SEEN BY THE FOLLOWING SHAPED BELL-CURVE:

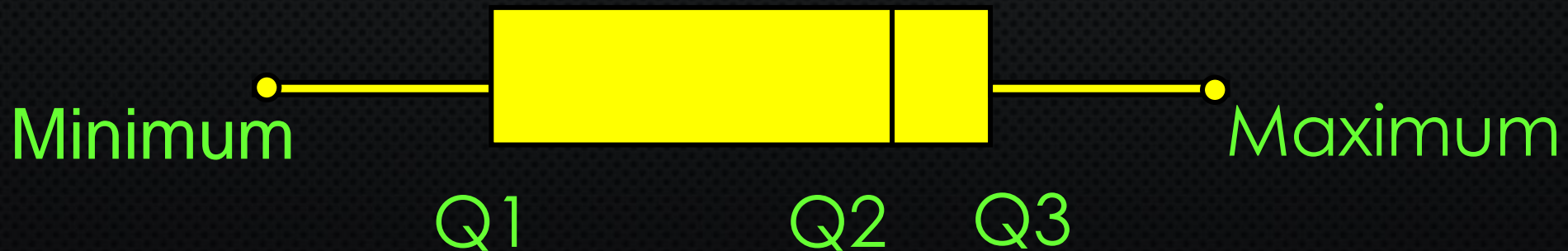
Normal Distribution



DISTRIBUTION OF DATA

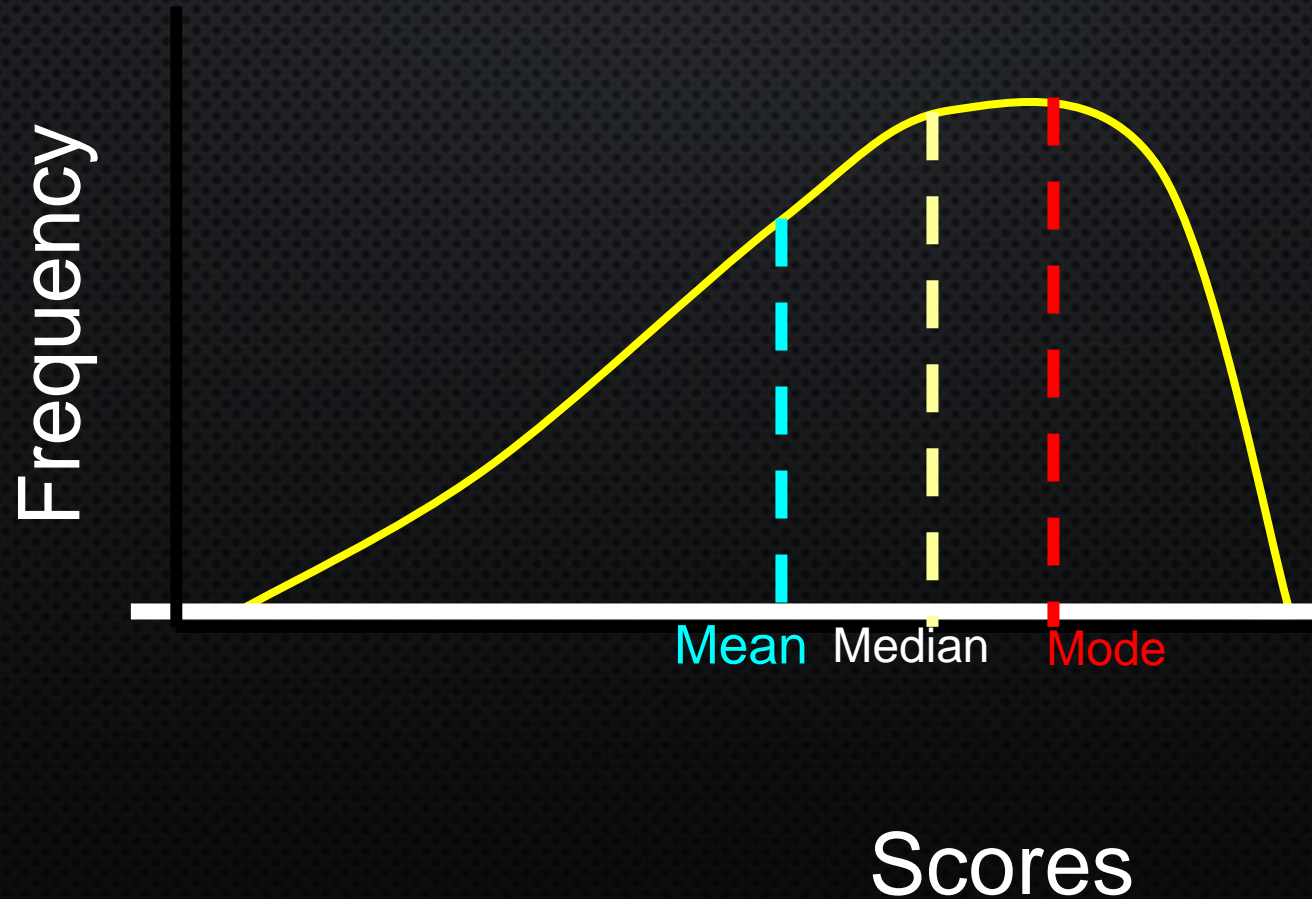
2. SKEWED TO THE LEFT DISTRIBUTION

In a **Box-and-Whisker Plot**, data is skewed to the left when **Q2 (MEDIAN)** is closer to **Q3**



IN A **DISTRIBUTION CURVE**, DATA THAT IS SKEWED TO THE LEFT RESULTS IN THE FOLLOWING CURVE:

MEAN < MEDIAN



DISTRIBUTION OF DATA

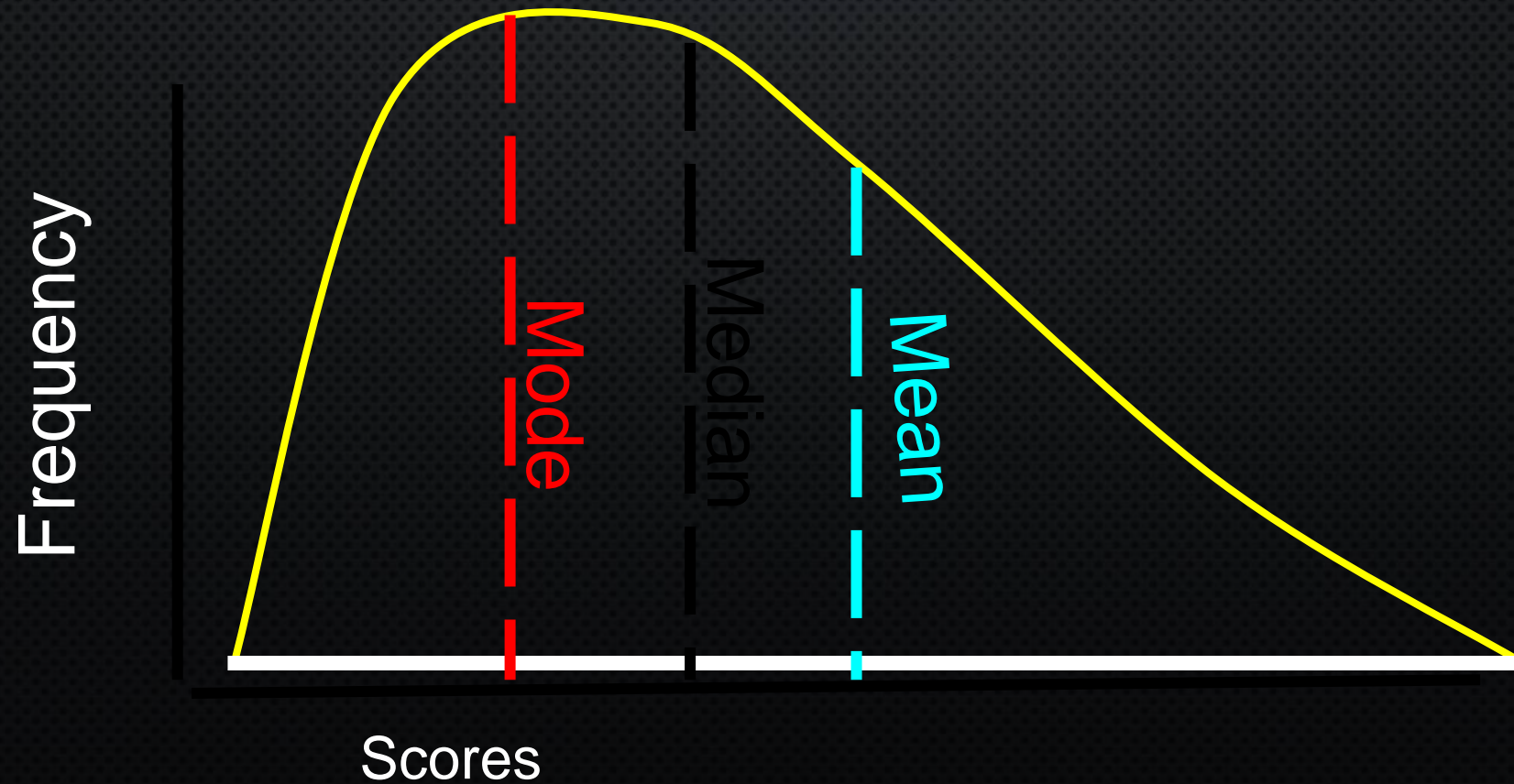
3. SKEWED TO THE RIGHT DISTRIBUTION

In a **Box-and-Whisker Plot**, data is skewed to the right when **Q2 (MEDIAN)** is closer to **Q1**



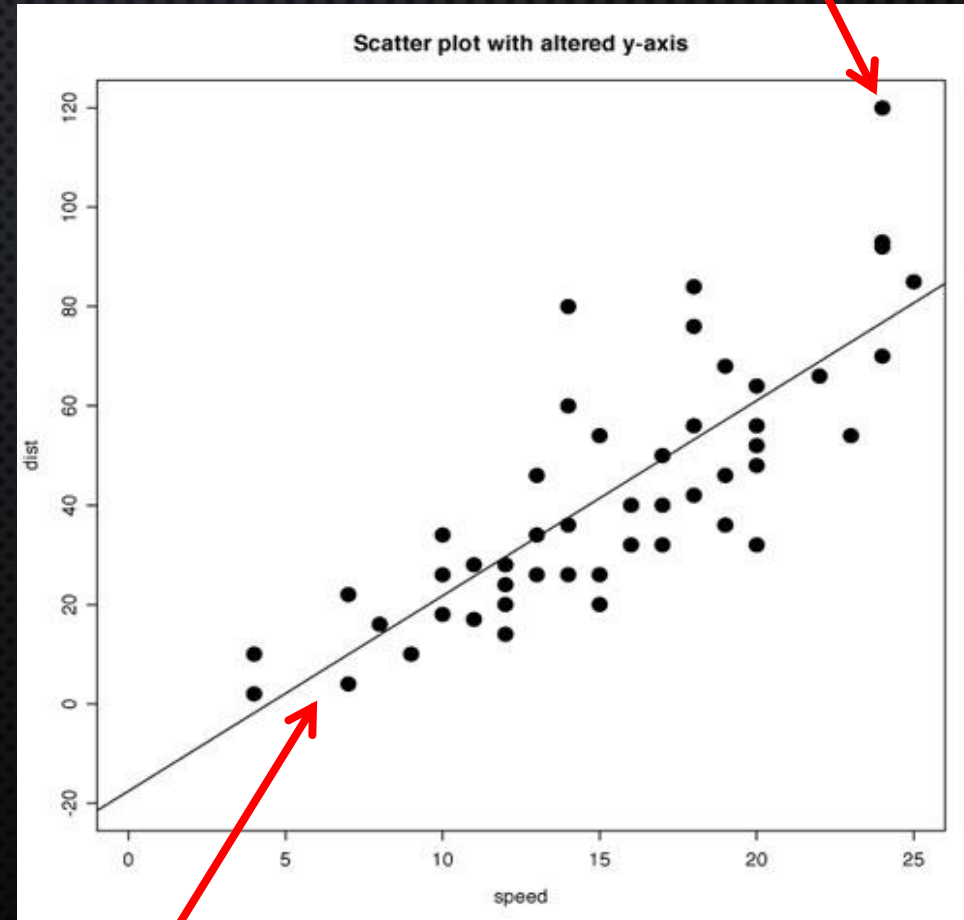
In a **Distribution Curve**, data that is skewed to the right results in the following curve:

MEAN > MEDIAN



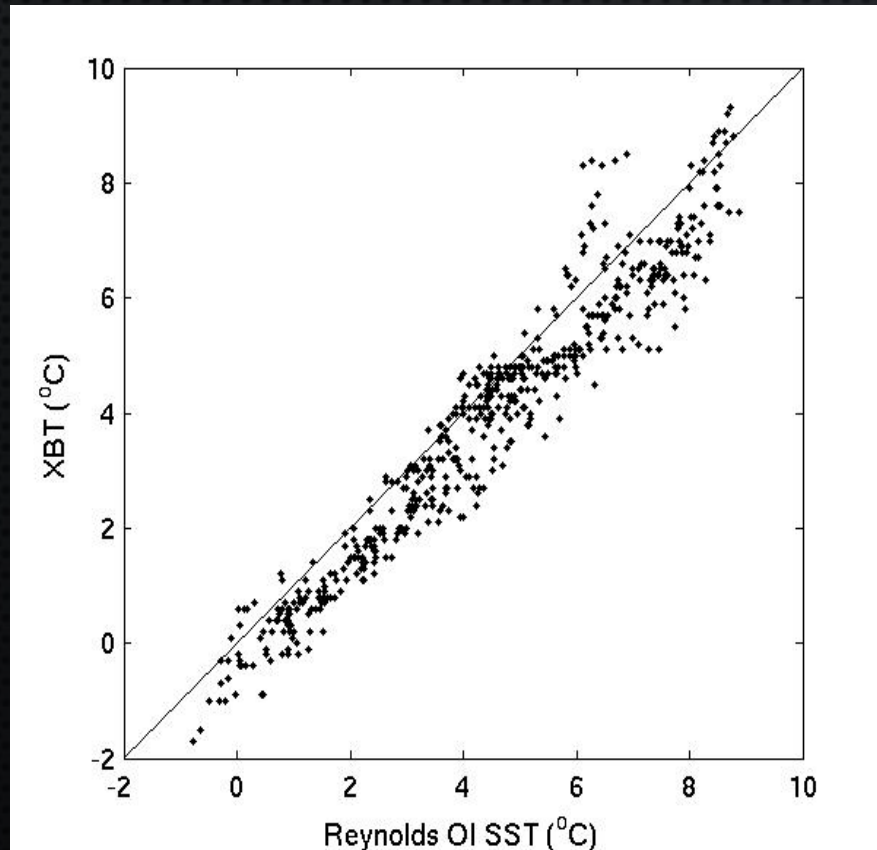
SCATTER PLOTS

- **USED TO DISPLAY BIVARIATE DATA (TWO SETS OF DATA)**
- **SHOWS A RELATIONSHIP OR CORRELATION BETWEEN 2 VARIABLES**
- **DRAW A LINE OF BEST FIT (A LINE THAT BEST FITS ALL THE DATA PLOTTED. IS A STRAIGHT LINE TO HELP PREDICT FUTURE VALUES. THE EQUATION OF THE LINE OF BEST FIT CAN BE OBTAINED BY USING YOUR CALCULATOR AS WELL.)**
- **IDENTIFY OUTLIERS (DATA THAT IS NOT WITH ALL THE OTHER DATA)**

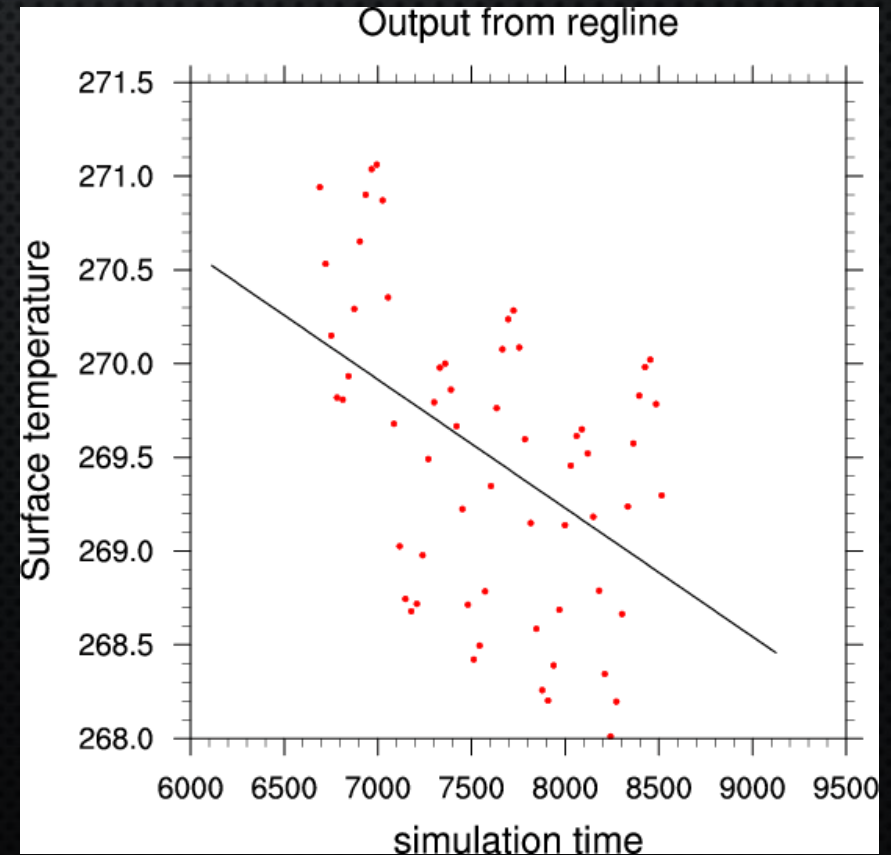


line of best fit

- A **POSITIVE CORRELATION** EXISTS WHEN THE LINE OF BEST FIT IS A **POSITIVE GRADIENT STRAIGHT LINE**



A **NEGATIVE CORRELATION** EXISTS WHEN THE LINE OF BEST FIT IS A **NEGATIVE GRADIENT STRAIGHT LINE**

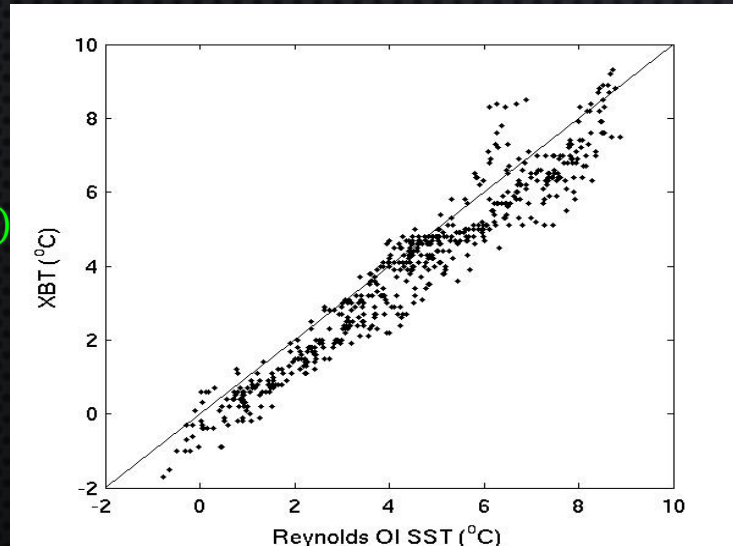


r is the correlation coefficient. It represents the

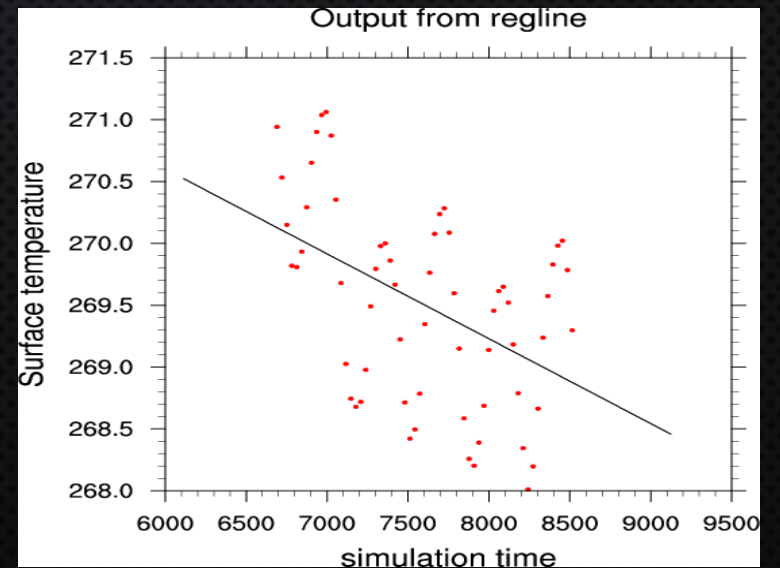
- Strength of the correlation. Closer to 1 or -1 the stronger the correlation is. (link between the two sets of data.)
- Whether the correlation is negative or positive (- or +)

Can be obtained from your calculator

POSITIVE & STRONG
CORRELATION ($r \approx 0.9$)



Negative & weak correlation ($r \approx -0.4$)



No correlation ($r \approx 0.1$)

