MAKING STATISTICS EASY USING A

CASIO

fx-82ZA PLUS II
SCIENTIFIC CALCULATOR

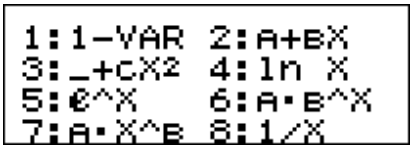
MODE 2: STATISTICS

Note we will only focus on Option 1 Data Handling and Option 2 Linear Regression.

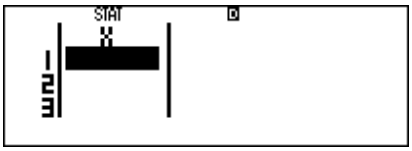
Key	Menu Item	Explanation
1.	1-VAR	Single variable / Data handling
2.	A + BX	Linear regression / Bi- variate data

MODE

2 STAT



Data Handling: 1



Eg: 14 learners in Grade 10 were asked to work out how many kilometers (km) they lived from school. The following list of data shows the distances in kms.

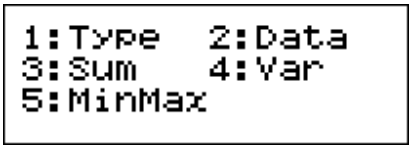
4; 7; 1; 9; 4; 8; 11; 10; 19; 2; 5; 7; 19; 3

First, we need to enter this information into the calculator.
Press equals after every input.

4 = 7 = 1 = 9 = 4 = 8 = 1 1 =
1 0 = 1 9 = 2 = 5 = 7 = 1 9 = 3 =

Press the AC Button to store this information AC

Press [SHIFT] [1] & a data handling menu will appear

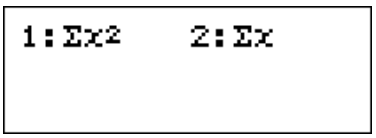


Breakdown of Data Handling Menu:

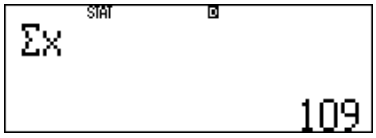
Key	Menu Item	Explanation
1. Type	Stats Menu	Changes stats type
2. Data		Displays the data that you input
3. Sum	1. Σx^2 2. Σx	1. Sum of the squares 2. Sum / Total of data
4. Var	1. n 2. $\bar{x}$ 3. δx 4. sx	1. Number of samples 2. Mean 3. Population standard deviation 4. Sample standard deviation
5. MinMax	1. Min 2. Max	1. Indicates the minimum value 2. Indicates the maximum value

A) What is the total distance, in kms, travelled by all the learners?

To calculate the total distance, you will select [3] SUM



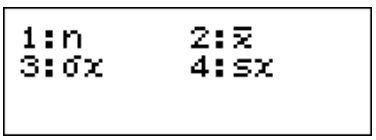
There are no squares in our data so select [2] [=]



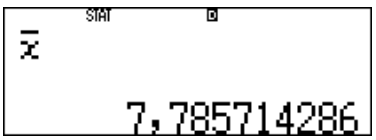
B) Calculate the mean distance these 14 learners live from school.

Press [AC] [SHIFT] [1]

To calculate the mean distance, you will select [4] VAR

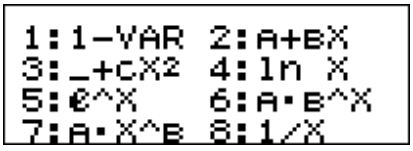


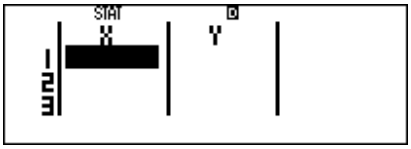
[2] (Mean) [=]



MODE

2 STAT





Linear Regression: 2

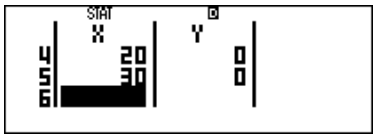
Linear regression is used to determine if there is a linear relationship between two different variables.

Eg: In this example we will look at the age of an appliance in months and its maintenance costs in rands.

X (Age)	Y (Cost)
5	90
10	140
15	250
20	300
30	380

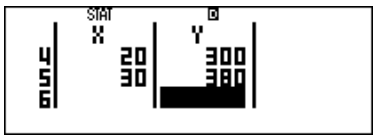
1. Input all the X Values first.

   5 = 10 = 15 = 20 = 30 =



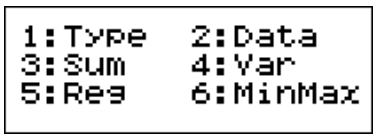
2. Input the Y Values next.

   ▼ ▶ 90 = 140 = 250 = 300 = 380 =

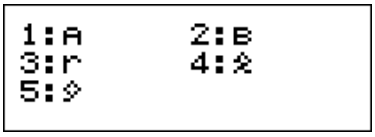


Remember to always check the data is correctly entered onto the calculator!

3. AC SHIFT 1



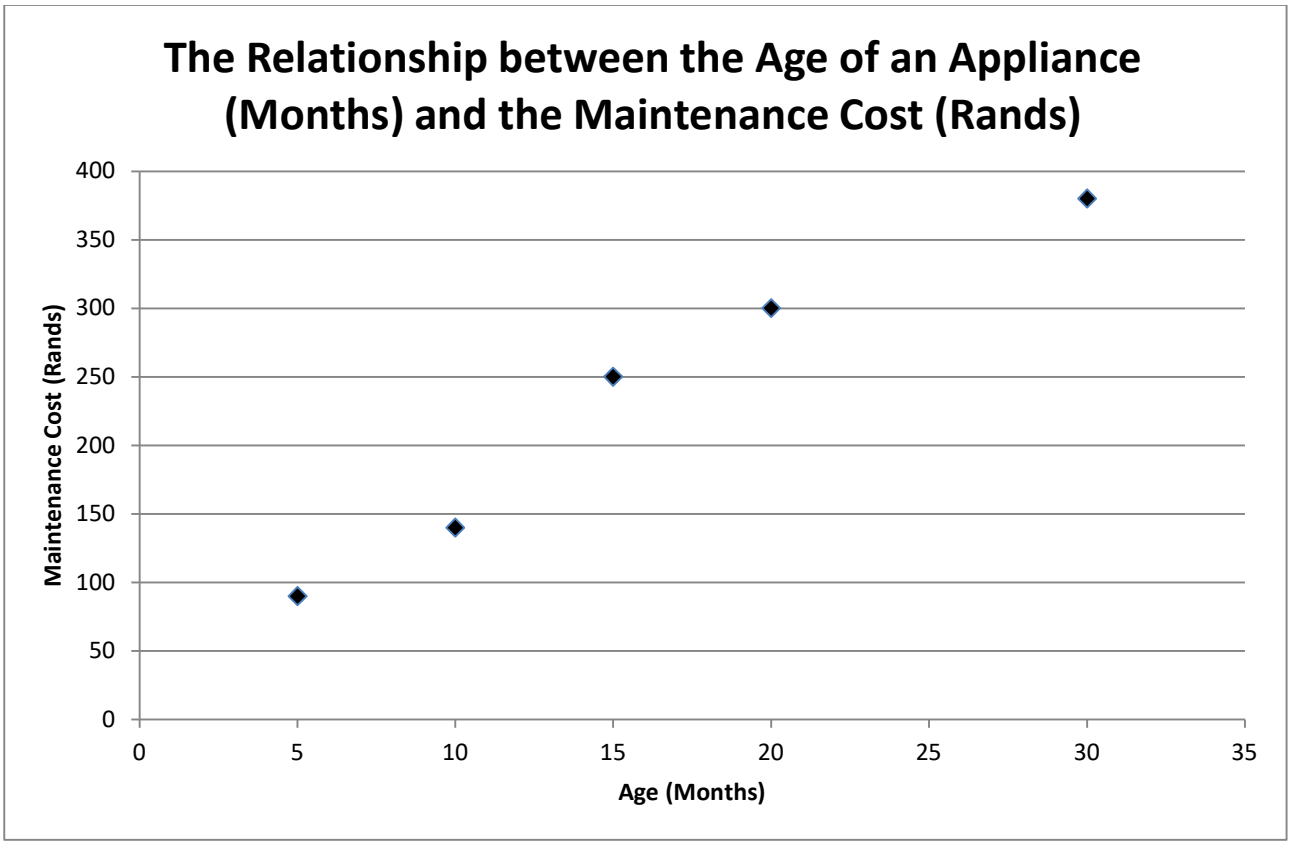
4. Select [5] for the Regression menu



Breakdown of Regression menu:

Menu Item	Explanation
1. A	Regression co- efficient of A
2. B	Regression co- efficient of B
3. r	Correlation co- efficient
4. $\hat{x}$	Estimated value of x
5. $\hat{y}$	Estimated value of y

To make it easier to understand you can represent this data on a scatter plot.



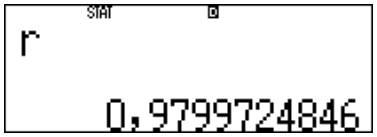
Correlation co-efficient (r) tells us the strength and direction of the correlation.

r lies between -1 and +1 **($-1 \leq r \leq 1$)**

- If r is close to 0, then there is a **weak linear** relationship
- If r is close to -1 or +1, there is a **strong linear** relationship

A. Calculate the correlation co- efficient of this data.

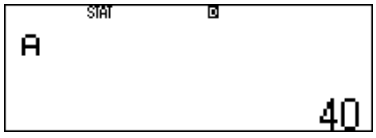
AC SHIFT 1 5 3 =



To do further regression calculations always press AC SHIFT 1 5

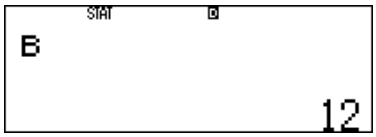
B. Calculate the Line of Best Fit (for this we need the value of A and B)

1 =



Remember AC SHIFT 1 5

2 =

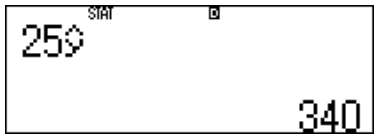


The Equation for the regression line (line of best fit) is y = A + Bx
So, y = 40 + 12x

Once you have calculated A and B you can calculate the estimated values of $\hat{x}$ & $\hat{y}$ (extrapolation and interpolation)

C. What will the approximate maintenance cost be if the appliance is 25 months old?

AC 2 5 SHIFT 1 5 5 =



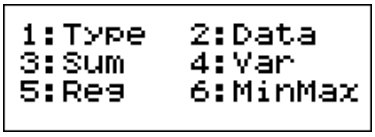
We need to find the estimated y value so we choose 5 $\hat{y}$

If the appliance is 25 months old if will cost approximately R340 to maintain.

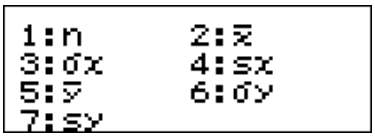
D. Draw in the line of best fit onto the scatterplot.

For the line of best fit we need 2 co- ordinates.
So far, we already have the y- intercept (A) (0;40).
The easiest way to find another co-ordinate is to find the mean of x and the mean of y.

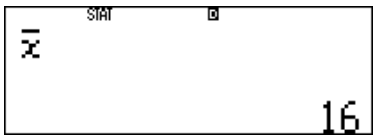
AC SHIFT 1



4 : Var

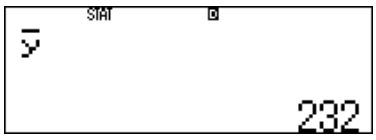


2 (mean of x) =



AC SHIFT 1 4

5 (mean of y) =



Plot the Line of Best Fit on the Scatter plot using the co- ordinates:
(0 ; 40) & (16 ; 232)