

Regression equation

How to find the equation of the y on x regression line from your GDC.

As a car's tires become worn, it uses more fuel to travel the same distance. This table shows the age of the tires and the number of kilometres the car travelled on one litre of diesel.

Age(years)	1	2	3	4	5	6
km/l	20	18.5	17.4	15.6	14.8	13.2

- Write down the regression equation.
- Interpret the meaning of the constant value.
- Interpret the meaning of the gradient of the regression line.
- Use the equation of the regression line to estimate the distance the car would have travelled on 1 litre of diesel when the tires were 3.5 years old.

Press **[stat]** 1:Edit and press **[enter]**


Enter the ages in the first column.

Press 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	-----	-----	-----	-----
2				
3				
4				
5				
6				

L1(?)=

Press  to move to the next column.

Enter the number km per l in the second column.

L1	L2	L3	L4	L5
1	20	-----	-----	-----
2	18.5			
3	17.4			
4	15.6			
5	14.8			
6	13.2			
-----	-----			

L2(7)=

To calculate the equation of the regression line

Press **stat** and **▶** to access the CALC menu.

Select 4:LinReg($ax+b$) and press **enter**.

Leave the X List as L_1 and the Y List as L_2 .

Enter Y_1 as the place to store the regression equation. To enter Y_1 press $\boxed{\text{X} \text{X} \text{X} \text{X}} \boxed{\text{f4}} \boxed{1:Y_1}$

Navigate down to Calculate and press **enter**.

LinReg(ax+b)
Xlist:L1
Ylist:L2
FreqList:
Store RegEQ:Y1
Calculate

Chapter 7 / **Example 5**

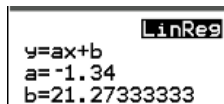
Regression equation

The form of the regression equation is ' $y = mx + b$ '

The GDC gives the values of $m = -1.34$ and $b = 21.3$

So the equation is $y = -1.34x + 21.3$

With brand new tires, the car would probably have travelled 21.3 km on 1 litre of diesel. Every year, the car travels 1.34 km less far on 1 litre of fuel.



```

LinReg
y=ax+b
a=-1.34
b=21.27333333
  
```

In the dialogue box, the instruction said to save the regression equation to Y_1 . You can use this to calculate a value from the equation.

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

Press **~~XXXX~~** **[f4]** 1: Y_1 .

Type (3.5).

The distance the car would have travelled on 1 litre of diesel when the tires were 3.5 years old is 16.6 km.



```

Y1(3.5)
.....16.58333333
  
```