*This activity assumes that you already know the steps to calculate a regression line as explained in the Basic level Help Sheet 411.*

The data below from (sheet 411) shows the number of births and deaths for ten similar sized suburbs in a city during a one year period.

$$\begin{bmatrix} 74 & 39 & 78 & 90 & 97 & 35 & 44 & 98 & 67 & 87 \\ 92 & 40 & 56 & 72 & 62 & 9 & 26 & 32 & 53 & 59 \end{bmatrix}$$

Enter the data into lists 1 and 2 and check that StatGraph 1 is set to produce a scatter plot.
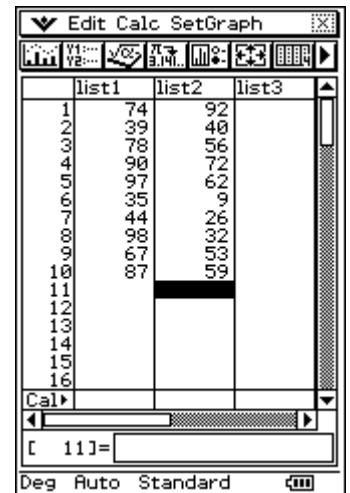
Tap **Calc**, **Linear Reg**. *

Check the settings are as shown, ensuring that Copy Formula is set to y1.

This will automatically copy the regression line into the first function (y1) in the graph editor. Note that any other function would also be OK to use.

Tap **OK** to confirm Set Calculation settings.
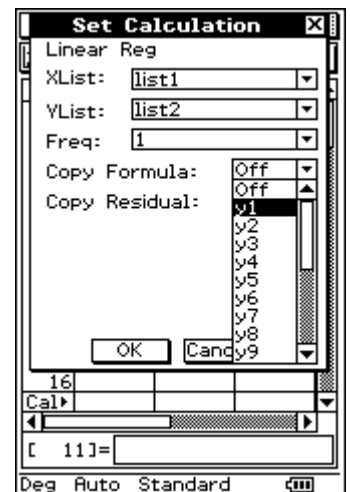
* Note that the method explained in this help sheet also applies to any other regression model appropriate for the data used.
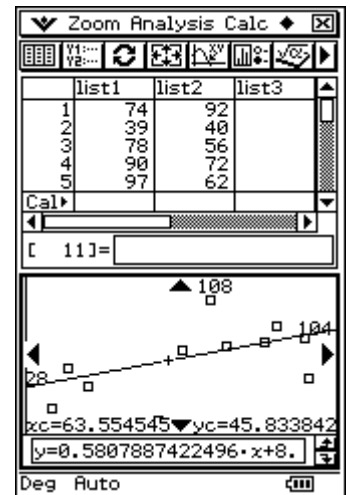
The linear regression coefficients are displayed.
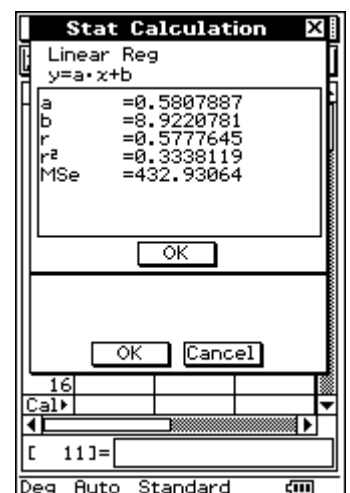
Tap **OK** to close the Stat Calculation window.

The regression line is drawn through the scatter plot.

Tap [🖉] and use the left and right cursor keys to trace along the regression line and observe the x and y-coordinates displayed at the bottom of the screen.
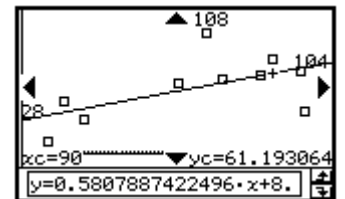
```
Zoom Analysis Calc ◆ ⊠
▦ 🖳 ⟳ 🔲 🖉 📊 🖐 ▶
     list1   list2   list3    ▲
  1    74      92
  2    39      40
  3    78      56
  4    90      72
  5    97      62              ▼
Cal▶
◀                             ▶
[  11]=

                ▲108
                 □
                            □  104
                        □ □ □ □
◀                    □        ▶
28  □          +
      □
  □
xc=63.554545▼yc=45.833842
y=0.5807887422496·x+8.  ⬦
Deg  Auto                    ▥
```

Find the expected value of y when x = 90.

Method 1:

Whilst in trace mode, press the (**9**) key, complete the x-value to be 90 and then tap **OK**.

```
  Enter Value    ⊠
x-value:[90
    OK  Cancel
```
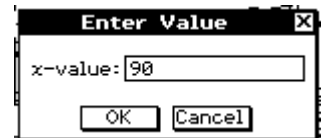
The cursor has jumped to (90, 61.193), and so the predicted value is 61.193.

Note that attempting to jump to points outside of the visible screen will give rise to a Domain error, making this method unsuitable for extrapolation.

```
                ▲108
                 □
                            □  104
                        □ □ □ +□
◀                    □        ▶
28  □
      □
  □
xc=90            ▼yc=61.193064
y=0.5807887422496·x+8.  ⬦
```

Method 2:

Tap on [🖐] to open up the main application.

Use the **abc** tab to type y1(90) and tap **EXE**.

This action substitutes the number 90 into the function (the regression line) stored in y1 resulting in 61.193.

This method is suitable for values involving extrapolation as the y1(200) calculation shows.

```
Edit Action Interactive ⊠
🖉 📐 📊 📊 🖐 📉 ▼         ▶
y1(90)                       ▲
              61.19306498
y1(200)
              125.0798266
□
                             ▼
mth abc cat 2D ⊠ ⬆ ⬇
1 2 3 4 5 6 7 8 9 0 ←
q w e r t y u i o p −
a s d f g h j k l ; \
⬆ z x c v b n m , . /
αβγ MATH SPACE SMBL EXE
Alg  Standard Real Deg ▥
```