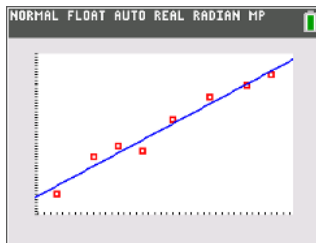## Part 1: Linear Regression Using Technology Practice

This table shows data for the full---time employees of a small company.

| Age (years)	Annual Income ($000)
33	33
25	31
19	18
44	52
50	56
54	60
38	44
29	35

a) Generate a scatterplot of the data.

b) Perform a linear regression and state the equation of the line of best fit. Explain what the slope and y---intercept mean in context.
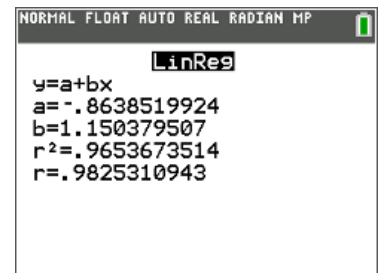
c) What is the correlation coefficient? What does this tell you about the relationship between age and annual income?

**d)** What is the coefficient of determination? What does it mean?

e) Use the line of best fit to predict the income for a 65 year old employee.


```
NORMAL FLOAT AUTO REAL RADIAN MP
Y₁(65)
                          73.91081594
■
```
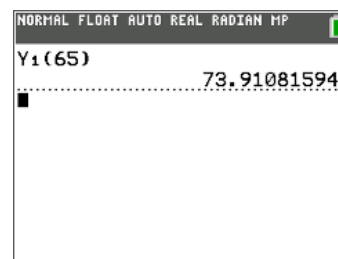
f) Find the residual values. What do they tell you about the correlation between the two variables?


```
NORMAL FLOAT AUTO REAL RADIAN MP
L1     L2     L3      L4     L5     ⌐
33     33    -4.099  ------ ------
25     31    3.1044
19     18    -2.993
44     52    2.2472
50     56    -.6551
54     60    -1.257
38     44    1.1494
29     35    2.5028
------ ------ ------
L₃={-4.098671726755,3.10436
```
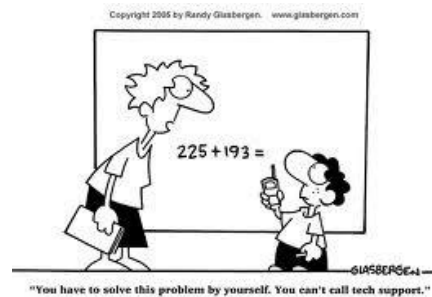


```
NORMAL FLOAT AUTO REAL RADIAN MP
```
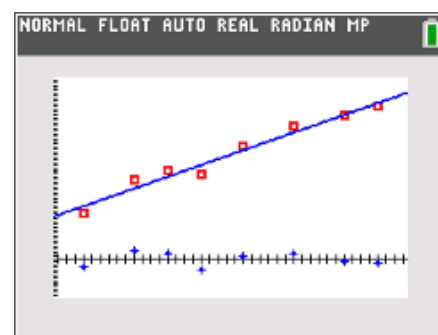
Part 2: Linear Regression by Hand

Example: The following table lists the mathematics of data management marks and grade 12 averages for a small group of students. Start by completing filling in the missing cells. You will need these values to calculate the correlation coefficient and equation of the line of best fit.

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225+193 =

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"You have to solve this problem by yourself. You can't call tech support."

MDM4U Mark (x)	Grade 12 Average (y)	x^2	y^2	xy
74	77	5476		
81	87	6561	7569	7047
66	68		4624	4488
53	67			3551
92	85	8464		7820
45	55	2025	3025	
80	76		5776	
$\sum x =$	$\sum y =$	$\sum x^2 =$	$\sum y^2 =$	$\sum xy =$

a) Determine the equation of the least squares regression line (line of best fit)

b) Calculate the correlation coefficient by hand