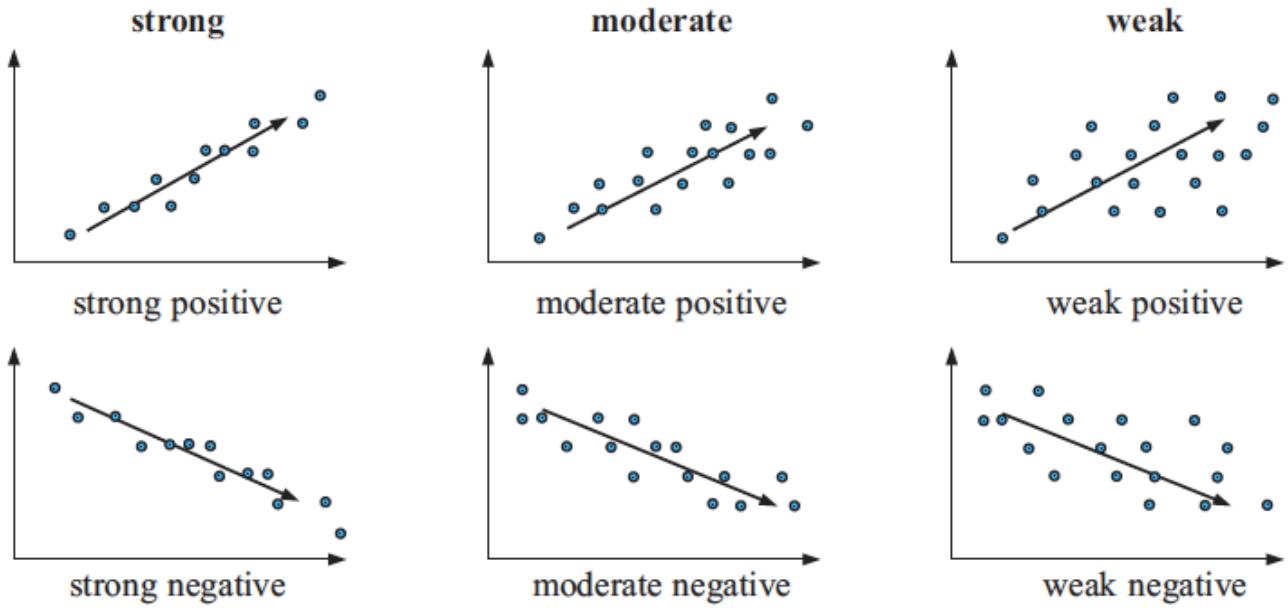
# Regression line

Correlation is the relationship between two variables.




Pearson's correlation coefficient r

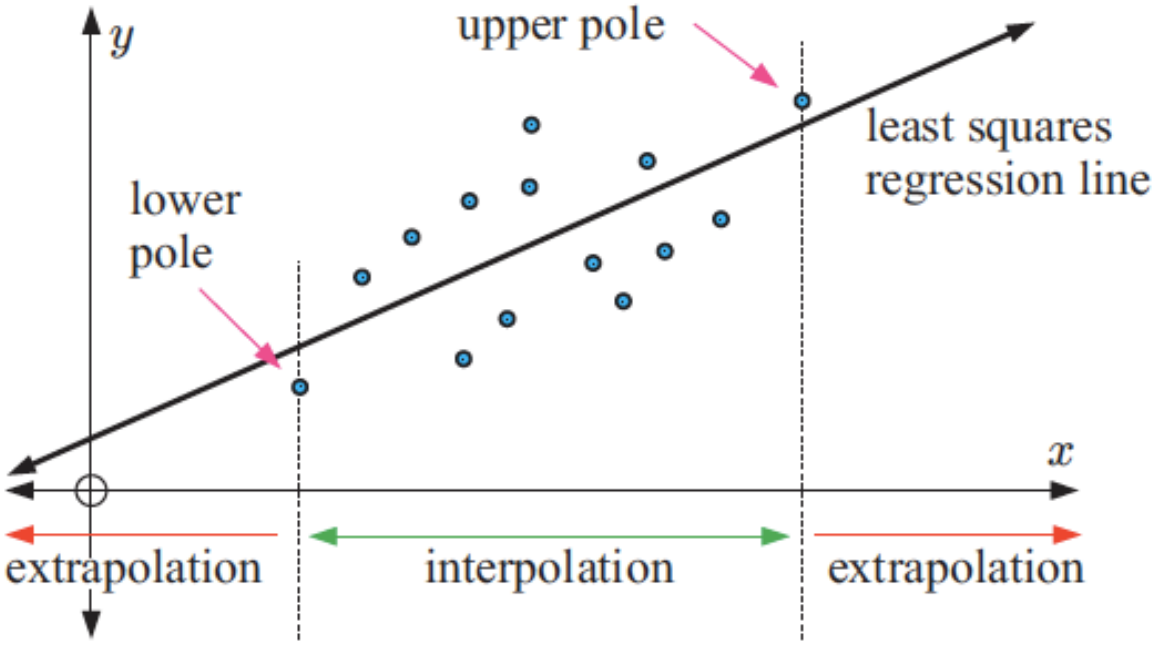
$$-1 \leq r \leq 1$$

The line of best fit must pass through the mean point and the y-intercept.

## Estimate using interpolation or extrapolation

It is reasonable to interpolate between the poles.

But unreliable to extrapolate outside the poles.



## GDC Skill

### TI 84

Stat → Edit → Put x in L1 and y in L2
→ Stat → CALC → 4: LinReg (ax + b)

### Casio

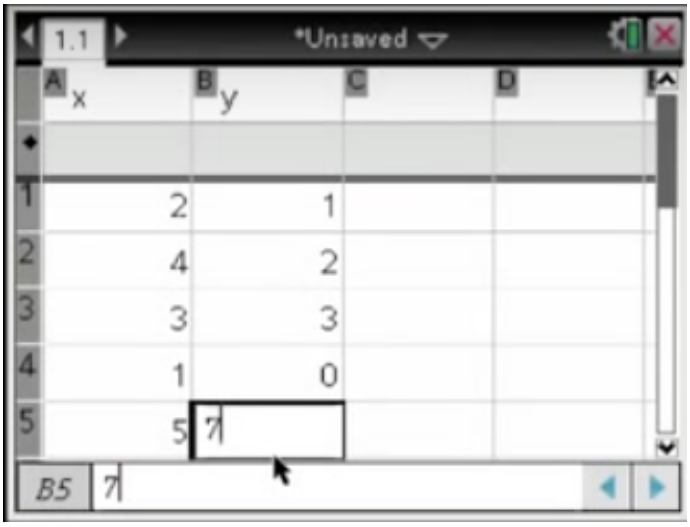
Menu → Stat → Put x in L1 and y in L2
→ F6 → F2 CALC → F3 REG → F1 X → F1 or F2

CHECK!!

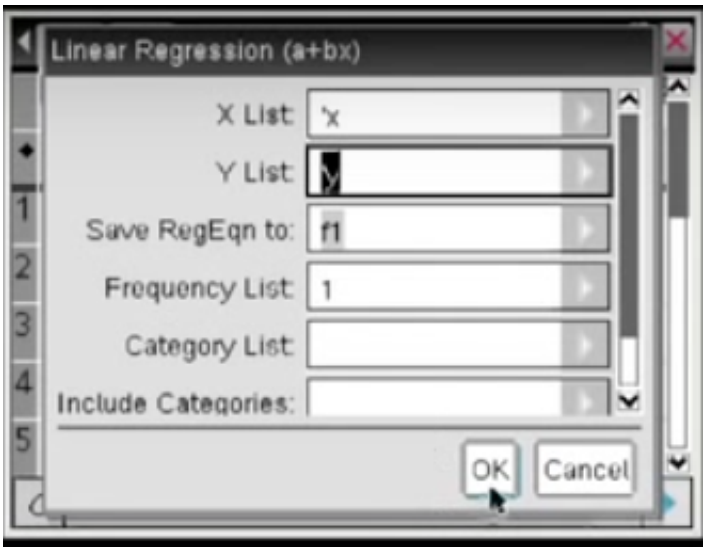
| | |
|---|---|
| 1Var XList | List 1 |
| 1Var Freq | List 2 |
| 2Var XList | List 1 |
| 2Var YList | List 2 |
| 2Var Freq | 1 |

## TI–nspire

New document → 4: Add Lists & Spreedsheet → Name A as x and B as y




→ Menu → 4: Statistics → 1: Stat Calculations → 4: Linear Regression (a + bx)



## Find the equation and r value

1. Over 10 days the maximum temperature and number of car break-ins was recorded for a city.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Maximum temperature $x$ (°C) | 22 | 17 | 14 | 18 | 24 | 29 | 33 | 32 | 26 | 22 |
| Number of car break-ins $y$ | 30 | 18 | 9 | 20 | 31 | 38 | 47 | 40 | 29 | 25 |

(a) Find the equation of line of best fit.
(b) Calculate r for the data.

2. The following table shows the average number of hours per day spent watching television by seven mothers and each mother's youngest child.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Hours per day that a mother watches television (x) | 2.5 | 3.0 | 3.2 | 3.3 | 4.0 | 4.5 | 5.8 |
| Hours per day that her child watches television (y) | 1.8 | 2.2 | 2.6 | 2.5 | 3.0 | 3.2 | 3.5 |

The relationship can be modelled by the regression line with equation $y = ax + b$.

(a) (i) Find the correlation coefficient.

(ii) Write down the value of a and of b.

Elizabeth watches television for an average of 3.7 hours per day.

(b) Use your regression line to predict the average number of hours of television watched per day by Elizabeth's youngest child. Give your answer correct to one decimal place.