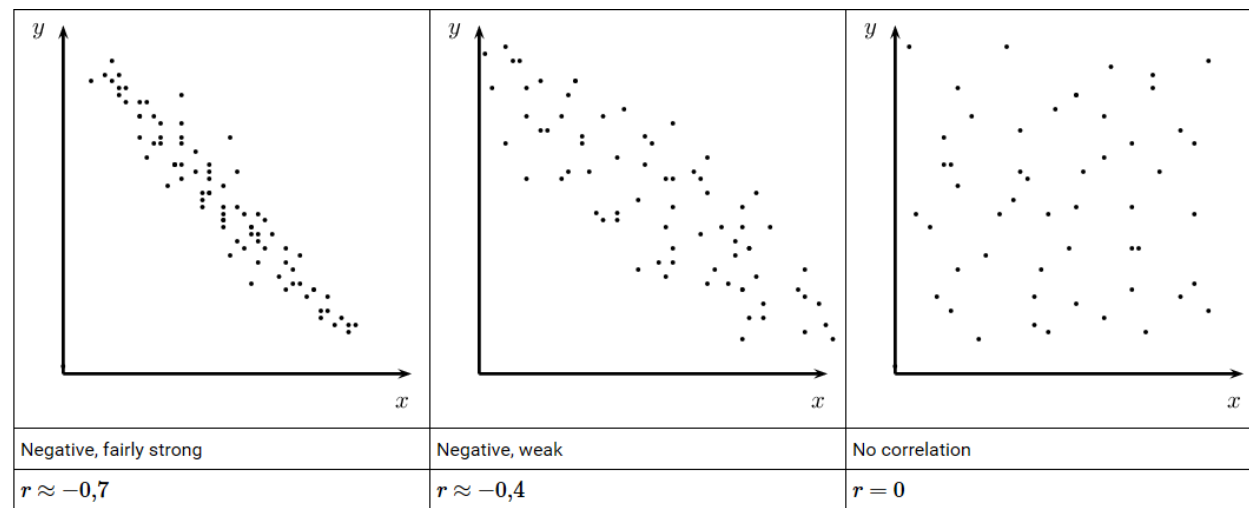
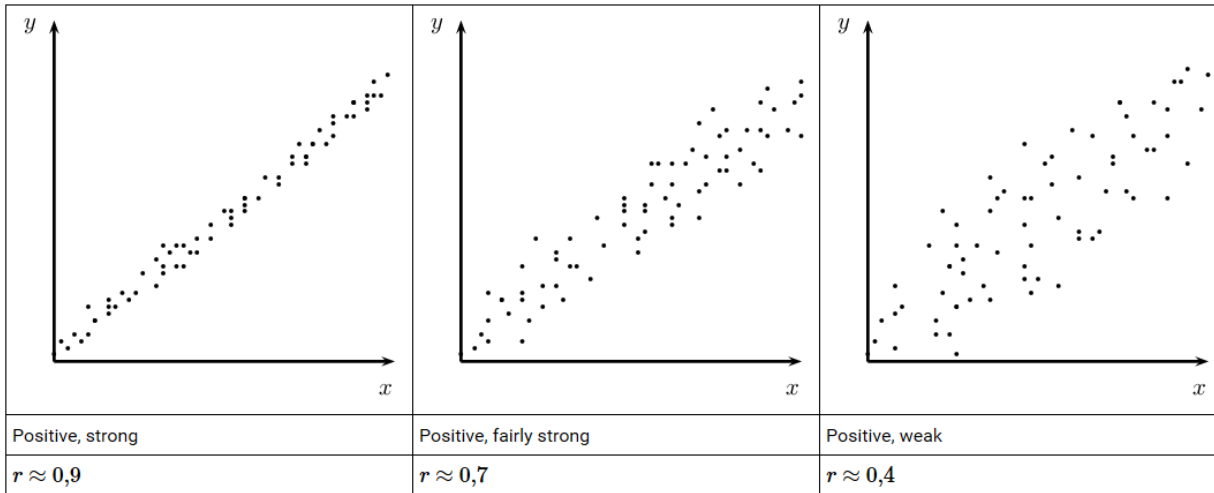


# Gr 12 Mathematics

## Statistics

### Correlation

The linear correlation coefficient,  $r$ , is a measure which tells us the strength and direction of a relationship between two variables. The correlation coefficient  $r \in [-1; 1]$ . When  $r = -1$ , there is perfect negative correlation, when  $r = 0$ , there is no correlation and when  $r = 1$  there is perfect positive correlation.



Positive	Strength	Negative
$r = 0$	no correlation	$r = 0$
$0 < r < 0,25$	very weak	$-0,25 < r < 0$
$0,25 < r < 0,5$	weak	$-0,5 < r < -0,25$
$0,5 < r < 0,75$	moderate	$-0,75 < r < -0,5$
$0,75 < r < 0,9$	strong	$-0,9 < r < -0,75$
$0,9 < r < 1$	very strong	$-1 < r < -0,9$
$r = 1$	perfect correlation	$r = -1$

#### Exercise 1

Work out the Correlation Coefficient and the equation of the line of best fit.

a)

$x$	0,1	0,8	1,2	3,4	6,5	3,9	6,4	7,4	9,9	8,5
$y$	-5,1	-10	-17,3	-24,9	-31,9	-38,6	-42	-55	-62	-64,8

$r = -0,95$ , negative, very strong.

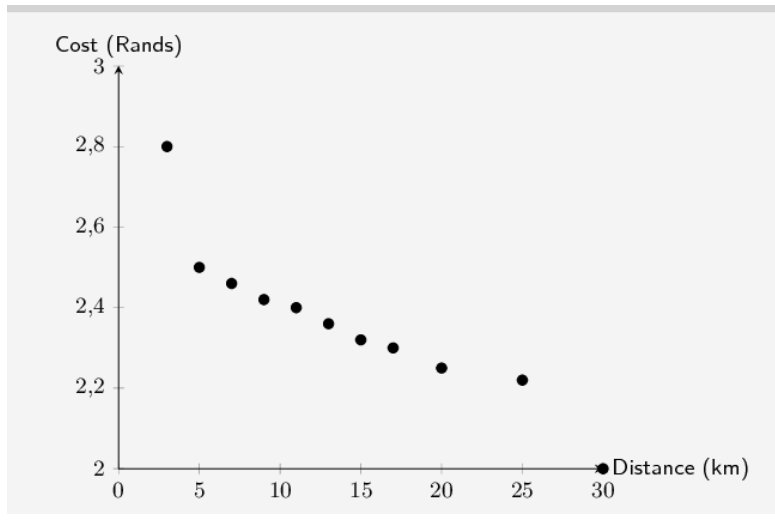
#### Exercise 2

Work out the Correlation Coefficient and the equation of the line of best fit. Draw a scatterplot of data as well.

Distance ( $x$ )	3	5	7	9	11	13	15	17	20	25	30
Cost ( $y$ )	2,8	2,5	2,46	2,42	2,4	2,36	2,32	2,3	2,25	2,22	2

## Exercise 2 Answers

### SCATTERPLOT

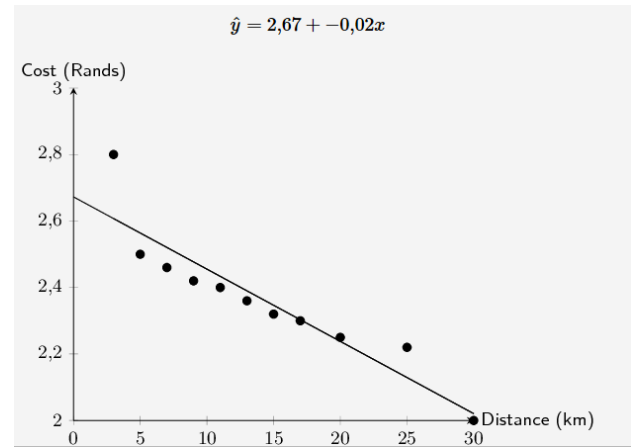


## Exercise 2 Answers

### CORRELATION COEFFICIENT ( $r$ )

$$r = -0,92$$

### LINE OF BEST FIT ( $y = a + bx$ )

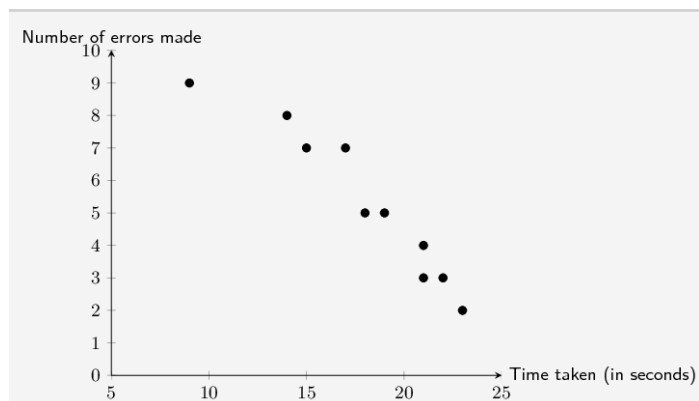


## Exercise 3

The time taken, in seconds, to complete a task and the number of errors made on the task were recorded for a sample of 10 primary school learners. The data is shown in the table below. [Adapted from NSC Paper 3 Feb-March 2013]

Time taken to complete task (in seconds)	23	21	19	9	15	22	17	14	21	18
Number of errors made	2	4	5	9	7	3	7	8	3	5

a) Draw a scatter plot of the data.



### LINE OF BEST FIT

$$a = 14,71$$

$$b = -0,53$$

$$\hat{y} = 14,71 - 0,53x$$

### CORRELATION COEFFICIENT

$$r = -0,96$$