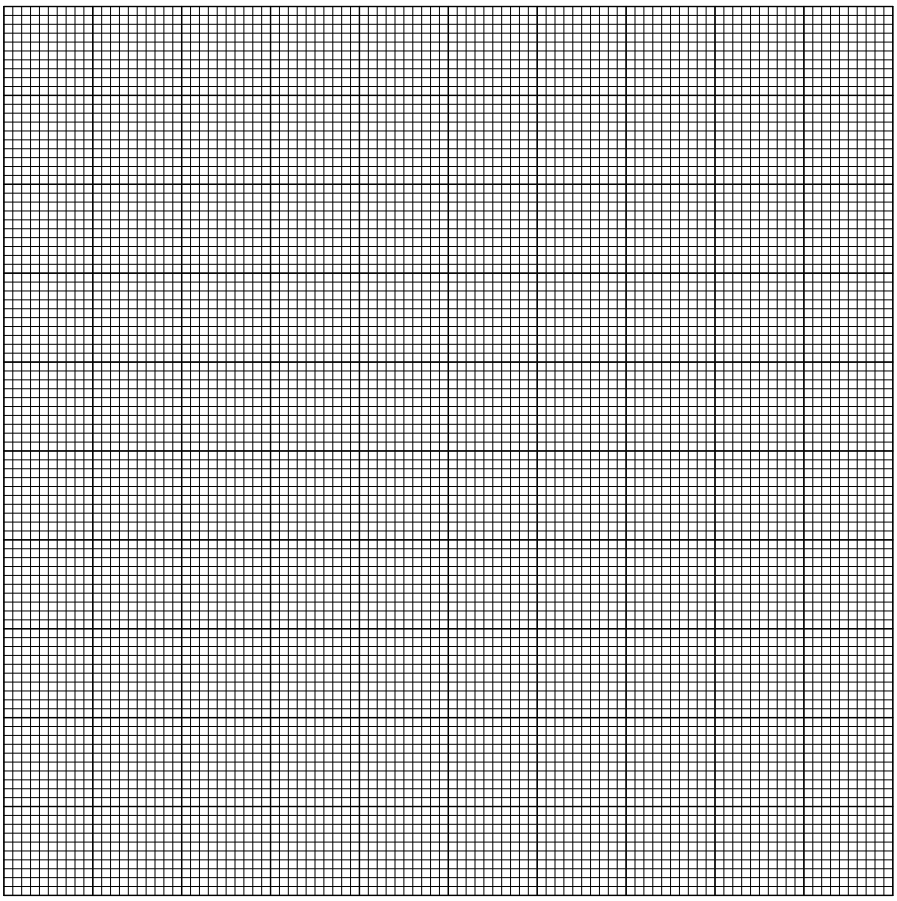
Question

You have collected the following data:

x	y
7.4	24
7.1	23
2.7	37
5.7	37
6.7	28
4.3	33
2.8	40
8.1	25
9.9	23
7.1	17

Please plot the data and a corresponding regression line.



Solution

Remember the formula for the correlation coefficient.

$$r = \frac{\sum x_i y_i - n\bar{x}\bar{y}}{(n-1)s_x s_y}$$

We calculate the necessary values.

x	y	xy
7.4	24	177.6
7.1	23	163.3
2.7	37	99.9
5.7	37	210.9
6.7	28	187.6
4.3	33	141.9
2.8	40	112
8.1	25	202.5
9.9	23	227.7
7.1	17	120.7
$\sum x = 61.8$	$\sum y = 287$	$\sum x_i y_i = 1644.1$
$\bar{x} = 6.18$	$\bar{y} = 28.7$	
$s_x = 2.32$	$s_y = 7.62$	

The regression line has the form

$$y = a + bx$$

So, a is the y-intercept and b is the slope. We have formulas to determine them:

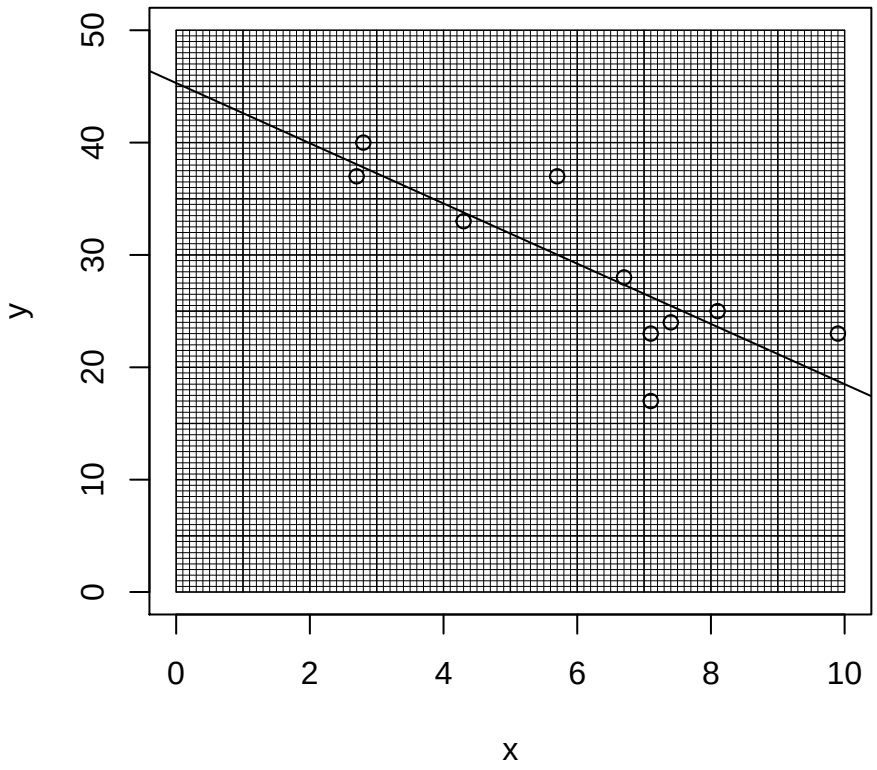
$$b = r\frac{s_y}{s_x} = -0.816 \cdot \frac{7.62}{2.32} = -2.68$$

$$a = \bar{y} - b\bar{x} = 28.7 - -2.68 \cdot 6.18 = 45.3$$

Our regression line:

$$y = 45.3 + -2.68x$$

Make a plot.



Meta-information

extype: num exsolution: 7.4, 7.1, 2.7, 5.7, 6.7, 4.3, 2.8, 8.1, 9.9, 7.1 exname: binomial exact extol: 0.01