

## Questions- Correlation and Regression

1. Five children aged 2, 3, 5, 7 and 8 years old weigh 14, 20, 32, 42 and 44 kilograms respectively.
  - a) Find the equation of the regression line of age on weight.
  - b) Based on this data, what is the approximate weight of a six year old child?
  - c) Plot the regression line (hint: `abline(lm(y~x))`)
  - d) Also plot the points (hint: `plot(x,y)`)
2. The success of a shopping center can be represented as a function of the distance (in miles) from the center of the population and the number of clients (in hundreds of people) who will visit. The data is given in the table below:

<b>No. Customer (x)</b>	<b>8</b>	<b>7</b>	<b>6</b>	<b>4</b>	<b>2</b>	<b>1</b>
<b>Distance (y)</b>	<b>15</b>	<b>19</b>	<b>25</b>	<b>23</b>	<b>34</b>	<b>40</b>

- a) Calculate the linear correlation coefficient.
  - b) If the mall is located 2 miles from the center of the population, how many customers should the shopping center expect?
  - c) To receive 5 customers, at what distance from the center of the population should the shopping centre be located?
3. The grades of five students in mathematics and chemistry classes are:

<b>Mathematics</b>	<b>6</b>	<b>4</b>	<b>8</b>	<b>5</b>	<b>3.5</b>
<b>Chemistry</b>	<b>6.5</b>	<b>4.5</b>	<b>7</b>	<b>5</b>	<b>4</b>

Determine the regression lines and calculate the expected grade in chemistry for a student who has a 7.5 in mathematics.

4. The heights (in centimeters) and weight (in kilograms) of 10 basketball players on a team are:

<b>Height (X)</b>	<b>186</b>	<b>189</b>	<b>190</b>	<b>192</b>	<b>193</b>	<b>193</b>	<b>198</b>	<b>201</b>	<b>203</b>	<b>205</b>
<b>Weight (Y)</b>	<b>85</b>	<b>85</b>	<b>86</b>	<b>90</b>	<b>87</b>	<b>91</b>	<b>93</b>	<b>103</b>	<b>100</b>	<b>101</b>

Calculate:

- a) The regression line of  $y$  on  $x$ .
- b) The coefficient of correlation.
- c) The estimated weight of a player who measures 208 cm.

5. From the following data of hours worked in a factory ( $x$ ) and output units ( $y$ ), determine the regression line of  $y$  on  $x$ , the linear correlation coefficient and determine the type of correlation.

Hours (X)	80	79	83	84	78	60	82	85	79	84	80	62
Production (Y)	300	302	315	330	300	250	300	340	315	330	310	240

6. A group of individuals has been surveyed on the number of hours devoted each day to sleeping and watching TV. The responses are summarized in the following table:

No. of sleeping hours ( $x$ )	6	7	8	9	10
No. of hours of television ( $y$ )	4	3	3	2	1

- a) Calculate the correlation coefficient.
- b) Determine the equation of the regression line of  $y$  on  $x$ .
- c) If a person sleeps eight hours, how many hours of TV are they expected to watch?

7. The following table summarizes the results of an aptitude test given to six employees to determine the correlation between test scores ( $x$ ) and sales in the first month ( $y$ ) in hundreds of dollars.

X	25	42	33	54	29	36
Y	42	72	50	90	45	48

Find the correlation coefficient and interpret the results.

Calculate the regression line of  $y$  on  $x$  and predict the sales of a vendor who obtains 47 on the test.