**Assignment on Linear regression**

Q.1 The values of y and their corresponding values of y are shown in the table below

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | 0 | 1 | 2 | 3 | 4 |
| y | 2 | 3 | 5 | 4 | 6 |

a) Find the least square regression line y = a x + b.  
b) Estimate the value of y when x = 10.

Q.2 Find the least square regression line for the following set of data

{(-1 , 0),(0 , 2),(1 , 4),(2 , 5)}

b) Plot the given points and the regression line in the same rectangular system of axes.

Q.3 a) The sales of a company (in million dollars) for each year are shown in the table below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x (year) | 2005 | 2006 | 2007 | 2008 | 2009 |
| y (sales) | 12 | 19 | 29 | 37 | 45 |

a) Find the least square regression line y = a x + b.  
b) Use the least squares regression line as a model to estimate the sales of the company in 2012.

Q.4 You have to study the relationship between the monthly e-commerce sales and the online advertising costs.You have the surveys results for 7 online stores for the last year.

|  |  |  |
| --- | --- | --- |
| Online Store | Monthly E-commerce Sales (in 1000 s) | Online Advertising Dollars(1000 s) |
| 1 | 368 | 1.7 |
| 2 | 340 | 1.5 |
| 3 | 665 | 2.8 |
| 4 | 954 | 5 |
| 5 | 331 | 1.3 |
| 6 | 556 | 2.2 |
| 7 | 376 | 1.3 |

Your task is to find the equation of the straight line that fits the data best.