



BE SEMESTER III

Subject Name: PROBABILITY AND STATISTICS

Subject Code: BE03000251

TUTORIAL- 5

Correlation and Regression

Ex.1	Compute Karl Pearson's coefficient of correlation between X and Y for the following data:																																	
	<table border="1"> <tbody> <tr> <td>x</td><td>10</td><td>14</td><td>18</td><td>22</td><td>26</td><td>30</td></tr> <tr> <td>y</td><td>18</td><td>12</td><td>24</td><td>6</td><td>30</td><td>36</td></tr> </tbody> </table>	x	10	14	18	22	26	30	y	18	12	24	6	30	36																			
x	10	14	18	22	26	30																												
y	18	12	24	6	30	36																												
Ex.2	Find coefficient of correlation between x and y if the regression lines are: $x + 6y = 6$ and $3x + 2y = 10$.																																	
Ex.3	In a partially, destroyed record on analysis of correlation data, only the following are legible: Variance of x , $x^2 = 9$, regression equation $8x - 10y + 66 = 0$, $40x - 18y = 214$. Find (i) mean values of x and y , (ii) the standard deviation of y .																																	
Ex.4	Ten competitors in a contest are ranked by three judges in the following order. Use the correlation coefficient to determine which pair of judges has the nearest approach.																																	
	<table border="1"> <tbody> <tr> <td>1st Judge</td><td>1</td><td>6</td><td>5</td><td>10</td><td>3</td><td>2</td><td>4</td><td>9</td><td>7</td><td>8</td></tr> <tr> <td>2nd Judge</td><td>3</td><td>5</td><td>8</td><td>4</td><td>7</td><td>10</td><td>2</td><td>1</td><td>6</td><td>9</td></tr> <tr> <td>3rd Judge</td><td>6</td><td>4</td><td>9</td><td>8</td><td>1</td><td>2</td><td>3</td><td>10</td><td>5</td><td>7</td></tr> </tbody> </table>	1st Judge	1	6	5	10	3	2	4	9	7	8	2nd Judge	3	5	8	4	7	10	2	1	6	9	3rd Judge	6	4	9	8	1	2	3	10	5	7
1st Judge	1	6	5	10	3	2	4	9	7	8																								
2nd Judge	3	5	8	4	7	10	2	1	6	9																								
3rd Judge	6	4	9	8	1	2	3	10	5	7																								
Ex.5	Calculate Pearson's coefficient of skewness for the following data:																																	
	<table border="1"> <tbody> <tr> <td>x</td><td>12</td><td>17</td><td>22</td><td>27</td><td>32</td></tr> <tr> <td>f</td><td>28</td><td>42</td><td>54</td><td>108</td><td>129</td></tr> </tbody> </table>	x	12	17	22	27	32	f	28	42	54	108	129																					
x	12	17	22	27	32																													
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Ex.6	Calculate the coefficient of correlation between x and y for the following data:																																	
	<table border="1"> <tbody> <tr> <td>x</td><td>65</td><td>66</td><td>67</td><td>67</td><td>68</td><td>69</td><td>70</td><td>72</td></tr> <tr> <td>y</td><td>67</td><td>68</td><td>65</td><td>68</td><td>72</td><td>72</td><td>69</td><td>71</td></tr> </tbody> </table>	x	65	66	67	67	68	69	70	72	y	67	68	65	68	72	72	69	71															
x	65	66	67	67	68	69	70	72																										
y	67	68	65	68	72	72	69	71																										
Ex.7	The following are the lines of regression $9y = x + 288$ and $4y = x + 38$. Estimate y when $x = 99$ and x when $y = 30$. Also, find the means of x and y .																																	

Ex.8	For a group of 10 items, $\Sigma x = 452$, $\Sigma x^2 = 24270$, and mode = 43.7. Find Karl Pearson's coefficient of Skewness.																										
Ex.9	Find the correlation coefficient for the following data: <table border="1"> <tr> <td>X</td><td>-3</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr> <tr> <td>Y</td><td>9</td><td>4</td><td>1</td><td>0.5</td><td>1</td><td>4</td><td>9</td></tr> </table>	X	-3	-2	-1	0	1	2	3	Y	9	4	1	0.5	1	4	9										
X	-3	-2	-1	0	1	2	3																				
Y	9	4	1	0.5	1	4	9																				
Ex.10	Calculate the regression coefficients and find the two lines of regression for the following data: Find the value of y when x=65. <table border="1"> <tr> <td>x</td><td>57</td><td>58</td><td>59</td><td>59</td><td>60</td><td>61</td><td>62</td><td>64</td></tr> <tr> <td>y</td><td>67</td><td>68</td><td>65</td><td>68</td><td>72</td><td>72</td><td>69</td><td>71</td></tr> </table>	x	57	58	59	59	60	61	62	64	y	67	68	65	68	72	72	69	71								
x	57	58	59	59	60	61	62	64																			
y	67	68	65	68	72	72	69	71																			
Ex.11	Two judges in a beauty contest rank the 12 contestants as follows <table border="1"> <tr> <td>x</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td></tr> <tr> <td>y</td><td>12</td><td>9</td><td>6</td><td>10</td><td>3</td><td>5</td><td>4</td><td>7</td><td>6</td><td>2</td><td>11</td><td>1</td></tr> </table> Calculate rank correlation coefficient.	x	1	2	3	4	5	6	7	8	9	10	11	12	y	12	9	6	10	3	5	4	7	6	2	11	1
x	1	2	3	4	5	6	7	8	9	10	11	12															
y	12	9	6	10	3	5	4	7	6	2	11	1															
Ex.12	The following data give the experience of machine operators and their performance rating as given by the number of good parts turned out per 100 piece. <table border="1"> <tr> <td>Operator</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr> <tr> <td>Performance rating (x)</td><td>23</td><td>43</td><td>53</td><td>63</td><td>73</td><td>83</td></tr> <tr> <td>Experience (y)</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> </table> Calculate the regression line of performance rating on experience and also estimate the probable performance if an operator has 11 years of experience.	Operator	1	2	3	4	5	6	Performance rating (x)	23	43	53	63	73	83	Experience (y)	5	6	7	8	9	10					
Operator	1	2	3	4	5	6																					
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