1. The income of a group of 10,000 persons was found to be normally distributed with means Rs. 750 p.m. and standard deviation of Rs. 50. Show that, of this group, about 95% had income exceeding Rs. 668 and only 5% had income exceeding Rs. 832. Also find the lowest income among the richest 100.

2. Calculate the mean deviation from the median of the following data:

<table>
<thead>
<tr>
<th>Wages per week (in Rs)</th>
<th>10-20</th>
<th>20-30</th>
<th>30-40</th>
<th>40-50</th>
<th>50-60</th>
<th>60-70</th>
<th>70-80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of workers</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>20</td>
<td>10</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

3. Fit a curve of the best fit of the type \( y = ae^{bx} \) to the following data by the method of least squares:
4. Two independent sample of sizes 7 and 9 have the following values:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>5</th>
<th>7</th>
<th>9</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>X</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Y</strong></td>
<td>10</td>
<td>15</td>
<td>12</td>
<td>15</td>
<td>21</td>
</tr>
</tbody>
</table>

5. A chemical extraction plant processes sea water to collect sodium chloride and magnesium. It is known that sea water contains sodium chloride, magnesium and other elements in the ratio 62:4:34. A sample of 200 tonnes of sea water has resulted in 130 tonnes of sodium chloride and 6 tonnes of magnesium. Are these data consistent with the known composition of sea water at 5% level of significance? (Given that tabular value of is 5.991 for 2 degree of freedom).

6. In a partially destroyed laboratory record of an analysis of correlation data, the following results are legible: Variance of x = 9; Regression equation: $8X - 10Y + 66 = 0$ and $40X - 18Y = 214$. Find on the basis of above information
   (i) mean values of X and Y
   (ii) coefficient of correlation between X and Y and
   (iii) standard deviation of Y.

Is there a significant difference between means of the two samples?
1. The following figures relate to the number of units sold in five different areas by four salesmen

<table>
<thead>
<tr>
<th>Area</th>
<th>Number of units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>I</td>
<td>80</td>
</tr>
<tr>
<td>II</td>
<td>82</td>
</tr>
<tr>
<td>III</td>
<td>88</td>
</tr>
<tr>
<td>IV</td>
<td>85</td>
</tr>
<tr>
<td>V</td>
<td>75</td>
</tr>
</tbody>
</table>

Determine whether there is any significant difference in the efficiency of these salesman? (Given: at 5% level, $F_{3,16} = 3.24$)

8. (a) In a class 5% of the boys and 10% of girls have an I.Q of more than 150. In this class 60% of the students are boys. If a student is selected at random and found to have an I.Q more than 150, find the probability that the student is a boy. (4)

(b) Find the mean and variance of Poisson distribution. Suggest one event from your day to day observations where you are sure to apply poisson model. (6)
9. (a) The Regression line of $y$ on $x$ is given by $y = 20 + 0.4x$. If mean of $x = 30$ and correlation coefficient $= 0.8$. Find regression equation of $x$ on $y$. 

(b) Find the first three moments of following data:

<table>
<thead>
<tr>
<th>X</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>2</td>
<td>8</td>
<td>7</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

State whether the distribution is leptokurtic or platykurtic

9. (a) For the data given below, find the quartile deviation and compute Bowley’s coefficient of skewness.

<table>
<thead>
<tr>
<th>Wages per week (Rs)</th>
<th>10-20</th>
<th>20-30</th>
<th>30-40</th>
<th>40-50</th>
<th>50-60</th>
<th>60-70</th>
<th>70-80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of workers</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>20</td>
<td>10</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

(b) Find rank correlation coefficient for the following data:

<table>
<thead>
<tr>
<th>x</th>
<th>74</th>
<th>75</th>
<th>78</th>
<th>72</th>
<th>78</th>
<th>77</th>
<th>79</th>
<th>81</th>
<th>79</th>
<th>76</th>
<th>72</th>
<th>71</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>47</td>
<td>44</td>
<td>40</td>
<td>48</td>
<td>49</td>
<td>45</td>
<td>46</td>
<td>42</td>
<td>42</td>
<td>39</td>
<td>46</td>
<td>40</td>
</tr>
</tbody>
</table>

(c) A bag contains 8 items of which 2 are defective. A man selects 3 items at random. Find the expected number of defective items he has drawn.