CHAPTER-15 STATISTICS 04 MARK TYPE QUESTIONS

Q. NO	QUESTION					
1.			4			
	A student collected 10 readings and atte	mpted to calculate the mean and variance.				
	Unfortunately, the student mistakenly u	sed a reading of 52 instead of the correct reading				
	25. The student calculated the mean and	l variance as 45 and 16 respectively.				
	Determine the correct mean and variand	e by considering the mistaken reading of 52 instead				
	of the actual reading 25.					
2.	The weights of coffee in 70 jars is shown	in the following table:	4			
	Weight Range (grams) Frequency					
	200 - 201 13					
	201 - 202 27	and the second s				
	202 - 203 18					
	203 - 204 10	Contraction of the second s				
	204 - 205 1					
	205 - 206 1					
	Determine variance and standard deviat	ion of the above distribution.				
3.	Read the text carefully and answer the	questions: For a group of 200 candidates, the mean	4			
	and the standard deviation of scores we	re found to be 40 and 15, respectively. Later on, it				
	was discovered that the scores of 43 and	35 were misread as 34 and 53, respectively.				
	Student Eng Hindi S.St Science Maths					
	Ramu 39 59 84 80 41					
	Rajitha 79 92 68 38 75 Komala 41 60 38 71 82					
	Patil 77 77 87 75 42					
	Pursi 72 65 69 83 67					
	Gayathri 46 96 53 71 39					
	1. Find the correct variance.					
	2. What is the formula of variance.					
	3. Find the correct mean.					
	4. Find the sum of correct scores.					
4.	There are 60 students in a class. The foll	owing is the frequency distribution of the marks	4			
	Marl	cs 0 1 2 3 4 5				
	Preq	uency $x - 2$ x x^2 $\begin{pmatrix} (x + 1) \\ 2 \end{pmatrix}$ $2x$ $x + 1$				
	where x is a positive integer. Determine	the mean and standard deviation of the marks				
5.	The mean and standard deviation	of 6 observations are 8 and 4 respectively. If	4			
	each observation is multiplied by a	then:				
		,				

	(a) Find the new mean.						
	(b) Find the new standard deviation of the resulting observations.						
6.	Mean and standard deviation of 100 observations were found to be 40 and 10, respectively. If at the time of calculation two observations were wrongly taken as 30 and 70 in place of 3 and 27 respectively, find the correct standard deviation.						
7.	Find the variance and the standard deviation for the following data: 57, 64, 43, 67, 49, 59, 44, 47, 61, 59						
8.	Find the mean deviation about the median of the following distribution:Class $0 - 10$ $10 - 20$ $20 - 30$ $30 - 40$ $40 - 50$ $50 - 60$ Frequency 6 8 14 16 4 2	4					

ANSWERS:

Q. NO

ANSWER

MARKS

1. Given while calculating the mean and variance of 10 readings, a student wrongly used the reading 52 for the correct reading 25. He obtained the mean and variance as 45 and 16 respectively Now we have to find the correct mean and the variance. As per given criteria, Number of reading, n=10 Mean of the given readings before correction, $\overline{x} = 45$ But we know, $\overline{\mathbf{x}} = \frac{\sum \mathbf{x}_i}{n}$ Substituting the corresponding values, we get $45 = \frac{\sum x_i}{10}$ $\Rightarrow \Sigma x = 45 \times 10 = 450$ It is said one reading 25 was wrongly taken as 52, So 5xi=450-52+25=423 So the correct mean after correction is $\overline{x} = \frac{\sum x_i}{n} = \frac{423}{10} = 42.3$ Also given the variance of the 10 readings is 16 before correction, i.e., σ²=16 But we know $\sigma^2 = \frac{\sum x_i^2}{n} - \left(\frac{\sum x_i}{n}\right)^2$ Substituting the corresponding values, we get $16 = \frac{\sum x_i^2}{10} - (45)^2$ $\Rightarrow 16 = \frac{\sum x_i^2}{10} - 2025$ $\Rightarrow 16 + 2025 = \frac{\sum x_i^2}{10}$ $\Rightarrow \frac{\sum x_i^2}{10} = 2041$ $\Rightarrow \sum x_i^2 = 20410$ It is said one reading 25 was wrongly taken as 52, so $\Rightarrow \sum x_i^2 = 20410 - (52)^2 + (25)^2$ $\Rightarrow \sum x_i^2 = 20410 - 2704 + 625$ $\Rightarrow \sum x_i^2 = 18331$ So the correct variance after correction is $\sigma^2 = \frac{18331}{10} - \left(\frac{423}{10}\right)^2$ σ²=1833.1-(42.3)²=1833.1-1789.29 $\sigma^2 = 43.81$ Hence the corrected mean and variance is 42.3 and 43.81 respectively.

$ \text{weight (in $		ple of the Biv		append o	iner colum	is after calculat	IONS
$\frac{200 - 201}{201 - 202} \frac{200.5}{201 - 202} \frac{13}{201 - 5} \frac{13}{27} \frac{13 \times 200.5 = 2606.5}{27 \times 27 \times 201.5 = 5440.5} \frac{1}{202 - 203} \frac{202.5}{202 - 203} \frac{18}{203 - 5} \frac{18}{10} \frac{10 \times 203.5 = 2035}{10} \frac{10 \times 203.5 = 2035} \frac{10}{204 - 205} \frac{10 \times 10}{205 - 5} \frac{10}{10 \times 203.5 = 205.5} \frac{1}{10 \times 203.5 = 205.6} \frac{1}{10 \times 10.6 = 25.6} \frac{1}{10 \times 10.6 = 10 \times 10 \times 10 \times 10^{-1} \frac{1}{10 \times 10^{-1}} \frac$	Weight (in grams)	Mid-Value (x _i)	Frequency (f _i)	fiXi			
$\frac{201 \cdot 202}{203 \cdot 203 \cdot 202.5} \frac{27}{18} \frac{27 \times 201.5 = 5440.5}{10 \times 203.5 = 2035} \frac{202.5}{203 \cdot 204 \cdot 5} \frac{18}{10 \cdot 10 \times 203.5 = 2035} \frac{203 \cdot 204}{205 \cdot 206 \cdot 205.5} \frac{10}{10 \cdot 10 \times 203.5 = 203.5} \frac{10}{10 \cdot 203.5 = 205.5} \frac{10}{10 \cdot 203.5 = 205.5} \frac{10}{10 \cdot 10 \times 10 \times 10^{2}} \frac{10}{20.5 = 205.5} \frac{10}{10 \cdot 203.5 = 10 \times 10.6} \frac{10 \times 1.6^{2}}{25.6} \frac$	200 - 201	200.5	13	13×200.5	5=2606.5		
$\frac{202 - 203}{204 - 205} \frac{202.5}{204 - 203.5} \frac{18}{10 \times 203.5 - 2035} \frac{18 \times 202.5 - 3645}{10 \times 203.5 - 2035} \frac{204 - 205}{204 - 205} \frac{204.5}{1} \frac{1}{1 \times 204.5 - 204.5} \frac{1}{205 - 206} \frac{205.5}{205 - 205.5} \frac{1}{1} \frac{1 \times 204.5 - 205.5}{205 - 205.5} \frac{1}{1 \times 102} \frac{1 \times 203.5 - 205.5}{1 \times 102} \frac{1 \times 102}{1 \times 102}$ Here mean, $\overline{x} = \frac{\Sigma I_X x}{N} = \frac{1 \times 137}{70} = 201.9$ So the above table with more columns is as shown below, $\frac{weight (in \ Mid- \ frequency \ d, \ x_1 - \overline{x} \ fd, \ fd^2 \ -205 \ 205 - 5 \ 12 \ 205 - 206 \ 205.5 \ 13 \ 200.5 \ 13 \ 200.5 \ -13 \times -1.4 \ 13 \times -1.4^2 \ 201.9 \ -10.8 \ -16.2 \ 201.9 \ -25.4 \ -25.4 \ -25.$	201 - 202	201.5	27	27×201.5	5=5440.5		
$\frac{203 - 204}{204 - 205} \frac{204.5}{204.5} \frac{1}{1} \frac{10 \times 203.5 = 2035}{1 \times 204.5 = 204.5} \frac{1}{205.5} \frac{1}{1 \times 205.5 = 205.5} \frac{1}{1 \times 205.5} 205.5} \frac{1}{1 \times$	202 - 203	202.5	18	18×202.5	5=3645		
$\frac{204 - 205}{205 - 206} = \frac{204.5}{205.5} \frac{1}{1} = \frac{1 \times 204.5 = 204.5}{1 \times 205.5 = 205.5}$ Total N=70 Σ f/x = 14137 Here mean, $\overline{x} = \frac{\Sigma f_{13}}{N} = \frac{1 \times 4127}{70} = 201.9$ So the above table with more columns is as shown below, $\frac{\frac{1}{9(ams)} \frac{1}{10au} \frac{1}{1$	203 - 204	203.5	10	10×203.5	5=2035		
$\frac{205 - 206}{1 \text{ total}} \frac{205.5}{1 \text{ total}} \frac{1}{N=70} \sum f_{(X)} = 14137}{\sum f_{(X)} = \frac{14137}{70} = 201.9}$ So the above table with more columns is as shown below, $\frac{\sqrt{200 - 201}}{200.5} \frac{13}{13} \frac{200.5}{201.5} \frac{13 \times 1.4e}{13 \times 1.4e} \frac{13 \times 1.4e}{13 \times 1.4e} \frac{1}{201 - 202} \frac{201.5}{20.5} \frac{27 \times 0.4e}{201.5} \frac{27 \times 0.4e}{10.8e} 27 $	204 - 205	204.5	1	1×204.5=	=204.5		
$ \begin{array}{ c } \hline Total & N=70 & \Sigma \ fx_i = 14137 \\ \hline Here mean, & \overline{x} = \frac{\nabla R}{N} = \frac{14137}{70} = 201.9 \\ \hline So the above table with more columns is as shown below, \\ \hline $	205 - 206	205.5	1	1×205.5=	=205.5		
Here mean, $\overline{x} = \frac{\sum f_1 x_1}{N} = \frac{14437}{70} = 201.9$ So the above table with more columns is as shown below, $\frac{\overline{y} \exp(1(n) \frac{M_1 v_2}{V_1 v_1 v_2} \frac{f_1 e_1}{(f_1)} \frac{1}{200.5}, \frac{1}{13 \times 1.4} \frac{1}{13 \times 1.4^2} \frac{1}{25.6} \frac{1}{25.6} \frac{1}{10.8} \frac{1}{202.2} \frac{1}{202.2} \frac{1}{202.5}, \frac{1}{202.2} \frac{1}{202.5}, \frac{1}{202.5}, \frac{1}{202.5}, \frac{1}{10 \times 1.6^2} \frac{1}{25.6} \frac{1}{6.6} \frac{1}{22.6} \frac{1}{2.2} \frac{1}{2.6} \frac{1}{2.2} \frac{1}{2.6} \frac{1}{2.2} \frac{1}{2.6} \frac{1}{2.2} \frac$		Total	N=70	$\Sigma f_i x_i = 14$	137		
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	So the above tak	ble with more	columns is	as shown	below,		
$\frac{200 - 201}{200.5} \frac{200.5}{13} \frac{13}{200.5} \frac{200.5}{21.42} \frac{13 \times 1.4^2}{-18.2} \frac{13 \times 1.4^2}{-25.48} \frac{13 \times 1.4^2}{-201.5} \frac{12 \times 201.5}{27} \frac{27 \times 0.4^2}{-0.4} \frac{27 \times 0.4^2}{-3.42} \frac{13 \times 1.4^2}{-27 \times 0.4^2} \frac{13 \times 0.4^2}{-27 \times 0.4^2} \frac{13 \times 0.4^2}{-27 \times 0.4^2} \frac{13 \times 0.4^2}{-$	Weight (in M grams) V (1id- Frequen /alue (f _i) x _i)	$\begin{vmatrix} d_i \\ = x_i - \overline{x} \end{vmatrix}$	fidi	fidi ²		
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	200 - 201 2	200.5 13	200.5- 201.9= -1.4	13×-1.4= -18.2	13×-1.4 ² =25.48		
$\frac{202 - 203}{203 - 204} \frac{202.5}{203 - 5} \frac{18}{10} \frac{102.5}{201.9} \frac{18 \times 0.6^2}{10.8} \frac{6.48}{6.48}$ $\frac{203 - 204}{203.5} \frac{203.5}{10} \frac{10}{203.5} \frac{10 \times 1.6^2}{16} \frac{10 \times 1.6^2}{25.6}$ $\frac{204 - 205}{204.5} \frac{204.5}{1} \frac{200.5}{201.9} \frac{1 \times 2.6^2}{2.6} \frac{1 \times 2.6^2}{6.76}$ $\frac{205 - 206}{205.5} \frac{205.5}{1} \frac{1 \times 201.9}{3.6} \frac{1 \times 3.6^2}{1 \times 2.96} \frac{1 \times 3.6^2}{3.6} \frac{1 \times 3.6^2}{1 \times 2.96}$ $\frac{205 - 206}{3.6} \frac{205.5}{1} \frac{1 \times 2.6}{205.5} \frac{1 \times 3.6}{1 \times 3.6} \frac{1 \times 3.6^2}{1 \times 2.96} \frac{1 \times 3.6^2}{3.6} \frac{1 \times 3.6^2}{3.6} \frac{1 \times 3.6^2}{3.6} \frac{1 \times 3.6^2}{1 \times 2.96} \frac{1 \times 3.6^2}{3.6} \frac{1 \times 3.6^2}{1 \times 2.96} \frac{1 \times 3.6}{3.6} \frac{1 \times 3.6^2}{3 \times 6} 1 \times 3.6^$	201 - 202 2	201.5 27	201.5- 201.9= -0.4	27×-0.4= -10.8	27×-0.4 ² =4.32		
$\frac{203 - 204}{203.5} \frac{203.5}{10} \frac{10 \times 1.6}{201.9} \frac{10 \times 1.6}{16} \frac{10 \times 1.6^2}{25.6}$ $\frac{204 - 205}{204.5} \frac{204.5}{1} \frac{1}{204.5} \frac{1 \times 2.6}{2.6} \frac{1 \times 2.6^2}{6.76}$ $\frac{205 - 206}{205.5} \frac{10 \times 205.5}{1} \frac{1 \times 205.5}{201.9} \frac{1 \times 3.6}{3.6} \frac{1 \times 3.6^2}{-12.96}$ $\frac{10 \times 100}{201.9} \frac{10 \times 100}{2.6} \frac{1 \times 3.6}{201.9} \frac{1 \times 3.6}{2.6} \frac{1 \times 3.6}{-12.96}$ And we know standard deviation is $\sigma = \sqrt{\frac{\Sigma f_1 d_1^2}{n}} - \left(\frac{\Sigma f_1 d_1}{n}\right)^2$ Substituting values from above table, we get $\sigma = \sqrt{\frac{81.6}{70}} - \left(\frac{4}{70}\right)^2$ $\sigma = \sqrt{1.17 - (0.057)^2}$ $\sigma = \sqrt{1.17 - 0.003249} = \sqrt{1.17}$ $\Rightarrow \sigma = 1.08g$ And $\sigma^2 = 1.08^2 = 1.17g$ Hence the variance and standard deviation of the distribution are 1.166g and 1.08 respectively.	202 - 203 2	202.5 18	202.5- 201.9=	18×0.6= 10.8	18×0.6²= 6.48		
$\frac{1}{204 - 205} \frac{204.5}{204.5} \frac{1}{1} \frac{204.5}{2.6} \frac{1 \times 2.6^2}{2.6} \frac{1 \times 2.6^2}{=6.76}$ $\frac{205 - 206}{205.5} \frac{205.5}{1} \frac{1}{205.5} \frac{1 \times 3.6^2}{201.9} \frac{1 \times 3.6^2}{3.6} \frac{1 \times 3.6^2}{=12.96}$ $\frac{1}{100} \frac{1}{100} \frac{1}{$	203 - 204 2	203.5 10	203.5- 201.9=	10×1.6= 16	10×1.6 ² = 25.6		
$\frac{205 - 206}{205.5} \frac{205.5}{1} \frac{1}{205.5} \frac{1 \times 3.6}{3.6} \frac{1 \times 3.6}{= 12.96} \frac{1 \times 3.6}{3.6} \frac{1}{= 12.96} \frac{1}{3.6} \frac{1}{= 12.96} \frac{1}{= 12.96} \frac{1}{3.6} \frac{1}{= 12.96} \frac{1}$	204 - 205 2	204.5 1	204.5- 201.9=	1×2.6= 2.6	1×2.6 ² =6.76		
$\frac{1}{10000000000000000000000000000000000$	205 - 206 2	205.5 1	205.5-201.9=	1×3.6= 3.6	1×3.6 ² =12.96		
And we know standard deviation is $\sigma = \sqrt{\frac{\sum f_i d_i^2}{n} - \left(\frac{\sum f_i d_i}{n}\right)^2}$ Substituting values from above table, we get $\sigma = \sqrt{\frac{81.6}{70} - \left(\frac{4}{70}\right)^2}$ $\sigma = \sqrt{1.17 - (0.057)^2}$ $\sigma = \sqrt{1.17 - 0.003249} = \sqrt{1.17}$ $\Rightarrow \sigma = 1.08g$ And $\sigma^2 = 1.08^2 = 1.17g$ Hence the variance and standard deviation of the distribution are 1.166g and 1.08 respectively.	т	Total N=70	3.0	$\Sigma f_i d_i = 4$	$\Sigma f_i d_i^2 = 81.6$		
and to be 40 and 15, respectively. Later on it was discovered that the scores of 43	And we know $\sigma = \sqrt{\frac{\sum f_i d_i^2}{n}}$ Substituting v $\sigma = \sqrt{\frac{81.6}{70}}$ $\sigma = \sqrt{1.17}$ $\sigma = \sqrt{1.17}$ $\Rightarrow \sigma = 1.08g$ And $\sigma^2 = 1.08^2$ Hence the var respectively.	standard devia $-\left(\frac{\sum f_i d_i}{n}\right)^2$ values from ab $-\left(\frac{4}{70}\right)^2$ $\overline{(0.057)^2}$ $\overline{(0.03249} = \sqrt{2}$ =1.17g riance and star	ation is ove table, w 1.17 ndard deviat	e get ion of the d	istribution a	e 1.166g and 1.0	8
and to be 40 and 15, respectively. Later on it was discovered that the scores of 43	r a group of 20	v candidate	s, the mea	an and the	e standard	deviation of s	cores were
	ound to be 40 and 15, respectively. Later on it was discovered that the scores of 43						

$$\begin{aligned} & \text{Variance} = \left(\frac{1}{n}\sum_{i}x_{i}^{2}\right) - \left(\frac{1}{n}\sum_{i}x_{i}\right)^{2} \\ & \div \frac{1}{200}\sum_{i}x_{i}^{2} - (40)^{2} = 225 \\ & \Rightarrow \frac{1}{200}\sum_{i}(x_{i})^{2} - 1600 = 225 \\ & \Rightarrow \sum_{i}(x_{i})^{2} = 200 \times 1825 = 365000 \end{aligned}$$
This is an incorrect reading.

$$\therefore \text{ Corrected}\sum_{i}(x_{i})^{2} = 365000 - 34^{2} - 53^{2} + 43^{2} + 35^{2} \\ & = 365000 - 1156 - 2809 + 1849 + 1225 \\ & = 364109 \end{aligned}$$
Corrected variance = $\left(\frac{1}{n} \times \text{ Corrected}\sum_{i}x_{i}\right) - (\text{ Corrected mean })^{2} \\ & = \left(\frac{1}{200} \times 364109\right) - (39.955)^{2} \\ & = 1820.545 - 1596.402 \\ & = 224.14 \end{aligned}$
Corrected variance = $\left(\frac{1}{n} \times \text{ Corrected}\sum_{i}x_{i}\right) - (\text{ Corrected mean })^{2} = \left(\frac{1}{200} \times 364109\right) - (39.955)^{2} \\ & = 1820.545 - 1596.402 \\ & = 224.143 \end{aligned}$
(ii) The formula of variance is $\frac{\sum_{i}x_{i}(x_{i}-x)^{2}}{n}$.
(iii) Corrected mean = $\frac{C \text{ Corrected}\sum_{i}x_{i}}{n}$.
(iii) Corrected mean = $\frac{C \text{ Corrected}\sum_{i}x_{i}}{200} \\ & = 39.955 \\ \text{ so } n = 200, \overline{X} = 40, \sigma = 15 \\ \frac{1}{n}\sum_{i}x_{i} = \overline{X} \\ & \div \frac{1}{200}\sum_{i}x_{i} = 40 \\ & \Rightarrow \sum_{i}x_{i} = 40 \times 200 = 8000 \\ \text{Since the score was misread, this sum is incorrect.} \\ & \Rightarrow \text{ Corrected}\sum_{i}x_{i} = 8000 - 34 - 53 + 43 + 35 \\ & = 8000 - 7 = 7993 \\ \text{ 4. To find: the mean and standard deviation of the marks. It is given that there are 60 students in the class, so \\ \sum_{i}f_{i} = 60 \\ & \Rightarrow (x - 2) + x + x^{2} + (x + 1)^{2} + 2x + x + 1 = 60 \\ & \Rightarrow 5x - 1 + x^{2} + x^{2} + 2x + 1 = 60 \\ & \Rightarrow 2x^{2} + 7x = 60 \\ & \Rightarrow 2x^{2} + 7x = 60 \\ & \Rightarrow 2x^{2} + 7x = 60 = 0 \\ \text{ Splitting the middle term, we get \\ \end{bmatrix}$

	$\Rightarrow 2x^2 + 15x - 8x - 60 = 0$	
	$\Rightarrow x(2x+15) - 4(2x+15) = 0$	
	$\Rightarrow (2x+15)(x-4) = 0$	
	$\Rightarrow 2x + 15 = 0 \text{ or } x - 4 = 0$	
	$\Rightarrow 2x = -15 \text{ or } x = 4$	
	And let the assumed mean $a = 2$	
	And lettile assumed mean, $u = 5$.	
	Applying the correct formula, the mean and standard deviation of the marks are found	
	to be 2.8 and 1.12 respectively.	-
5.	(a) Let the observations be x_1, x_2, x_3, x_4, x_5 and x_6	4
	It is given that mean is 8 and standard deviation is 4.	
	\Rightarrow Mean $(\bar{x}) = \frac{x_1 + x_2 + x_3 + x_4 + x_5 + x_6}{\epsilon} = 8 \dots (1)$	
	If each observation is multiplied by 3 and the resulting observation are v_i .	
	then $v = 3x_i$ for $i = 1$ to 6	
	: Now moon $(\overline{y}) - y_1 + y_2 + y_3 + y_4 + y_5 + y_6$	
	$\frac{6}{6}$	
	$= 3 \left\{ \frac{x_1 + x_2 + x_3 + x_4 + x_5 + x_6}{\epsilon} \right\}$	
	=3x8 [Using (1)]	
	=24	
	(b) Standard deviation (σ)= $\sqrt{\frac{1}{n}\sum_{i=1}^{6}(x_i - \bar{x})^2}$	
	$4^{2} = \frac{1}{6} \sum_{i=1}^{6} (x_{i} - \overline{x})^{2}$	
	$\sum_{i=1}^{3} (x_i - \bar{x})^2 = 96 \dots \dots \dots \dots \dots (2)$	
	i=1	
	From (1) and (2) it can be observed that	
	$\overline{y} = 3\overline{x}$	
	$\bar{\mathbf{x}} = \frac{1}{3}\bar{\mathbf{y}}$	
	Substituting the values of x_i and \overline{x} in (2) we obtain	
	$\sum_{i=1}^{6} \left(\frac{1}{3}y_i - \frac{1}{3}\overline{y}\right)^2 = 96$	
	$\sum_{i=1}^{n} (y_i - \bar{y})^2 = 864$	
	$\begin{bmatrix} 1 \text{ nervice, variance of new observation} = (-\times 864) = 144 \\ 6 \\ \hline \\ \hline$	
	Hence, the standard deviation of new observations is $\sqrt{144}$ =12	

6.	S.D(σ) = $\sqrt{\frac{1}{n}\sum x^2 - \left(\frac{1}{n}\sum x\right)^2}$	4
	Given $\bar{\mathbf{x}} = 40$ and S.D=10, N=100	
	$\frac{1}{n}\sum x = 40$	
	$\Rightarrow \frac{1}{100} \sum x = 40$	
	$\Rightarrow \sum x = 4000$	
	$\therefore \sum x = 4000 - 30 - 70 + 3 + 27 = 3930$	
	$\therefore \text{ correct mean} = \frac{1}{n} \sum x = 3930/100 = 39.30$	
	Given S.D (σ) =10	
	σ² =100	
	$\frac{1}{n}\sum x^2 - \left(\frac{1}{n}\sum x\right)^2 = 100$	
	$\frac{1}{100}\sum x^2 - (40)^2 = 100$	
	$\frac{1}{100}\sum x^2 = 100 + 1600$	
	$\frac{100}{\sum} x^2 = 100 \times 1700$	
	\therefore 30 and 70 should be replaced by 3 and 27	
	$S.D(\sigma)$	
	$=\sqrt{\frac{1}{n}\sum x^{2}-\left(\frac{1}{n}\sum x\right)^{2}}$	
	$=\sqrt{\frac{164938}{100}-\left(\frac{3930}{100}\right)^2}$	
	$=\sqrt{104.89}$	
	S.D(σ)=10.241	
7.	Mean = 550/10 = 55	4
	Variance(σ^2) = (x _i - μ) ² /n =(2 ² +9 ² +12 ² +12 ² +6 ² +4 ² +6 ² +4 ² +11 ² +8 ²)/10	
	= 662/10 = 66.2	
	Therefore, variance(σ^2) = 66.2	
	Standard Deviation(σ) = $\sqrt{\sigma^2}$ = $\sqrt{66.2}$ = 8.13	

8.	Class	f	cf	Mid-Value <i>x</i>	x - M	f x-M	4
	0 – 10	6	6	5	22.86	137.16	
	10 - 20	8	14	15	12.86	102.88	
	20 - 30	14	28	25	2.86	40.04	
	30 - 40	16	44	35	7.14	114.24	
	40 - 50	4	48	45	17.14	68.56	
	50 - 60	2	50	55	27.14	54.28	
		$\Sigma f = 50$				$\Sigma f x - M $	
						= 517.16	
	$\frac{n}{2} = 25 \text{ lies in the interval } 20 - 30 \text{ (Median Class). } l=20 \text{ , } f = 14, \text{ cf} = 14$ Median M=l+ $\left(\frac{\frac{n}{2} - cf}{f}\right) \times h = 27.86$ Mean Deviation about the Median = $\frac{\Sigma f x-M }{\Sigma f} = 10.34$						