Application of C.V:

$$C.V = \frac{\sigma}{\bar{x}}.100;$$

$$\sigma = standard\ deviation;\ \bar{x} = mean$$

Calculating C.V for company A:

Xi	$d_i = \frac{x_i - A}{c}$	${d_i}^2$				
315	-50	2500				
320	-45	2025				
350	-15	225				
340	-25	625				
360	-5	25				
365(A)	0	0				
355	-10	100				
370	5	25				
372	7	49				
378	13	169				
410	45	2025				
390	25	625				
	$\sum_{i=1}^{n} d_i = -55$	$\sum {d_i}^2 = 8393$				

$$\bar{x} = A + \frac{\sum_{i=1}^{n} d_i}{N}.c$$

$$= 365 + \frac{-55}{12}.1 = 360.41$$

$$A = approximate\ mean$$

$$\sigma = \sqrt{\left[\frac{\sum {d_i}^2}{n} - \left(\frac{\sum_{i=1}^{n} d_i}{N}\right)^2\right]}.c$$

$$= \sqrt{\left[\frac{8393}{12} - \left(\frac{-55}{12}\right)^2\right]}.1$$

$$= 26.038$$

$$C.V = \frac{\sigma}{\bar{x}}.100 = \frac{26.038}{360.41}.100 = 7.22\%$$

Mean deviation:

The average of absolute deviation of each observation from their mean is called mean deviation

$$Absolute\ deviation = |x_i - \bar{x}|; \bar{x} = mean$$

$$M.D = \frac{\sum_{i=1}^{n} f_i |x_i - \bar{x}|}{N}$$

Problem: Calculate mean deviation from the following frequency distribution:

Marks	No. of students(fi)	xi	$fixi$	$\lvert x_i - \bar{x}\rvert$	$f_i\lvert x_i - \bar{x}\rvert$
0-10	5	5	25	22.6	113
10-20	12	15	180	12.6	151.2
20-30	8	25	200	2.6	20.8
30-40	15	35	525	7.4	111
40-50	10	45	450	17.4	174
Total	N=50		$\sum f_i x_i = 1380$		$f_i\lvert x_i - \bar{x}\rvert = 570$

$$M.D = \frac{\sum_{i=1}^{n} f_i\lvert x_i - \bar{x}\rvert}{N} = \frac{570}{50} = 11.4;$$

$$\bar{x} = \frac{\sum f_i x_i}{N} = \frac{1380}{50} = 27.6$$

Next: Calculating missing frequency, quartile deviation