SEC-B

Range	f	x	$(x-A)$	$f(x-A)$	$(x-A)^2$	$f(x-A)^2$	$(x-A)^3$	$f(x-A)^3$	$(x-A)^4$	$f(x-A)^4$	cumulative Frequency
2-4	38	3	-4	-152	16	608	-64	-2432	256	9728	38
4-6	292	5	-2	-584	4	1168	-8	-2336	16	4672	330
6-8	389	7(A)	0	0	0	0	0	0	0	0	719
8-10	212	9	2	424	4	848	8	1696	16	3392	93
10-12	89	11	4	276	16	1104	64	4416	256	17664	1000
	$\Sigma f =$ 1000			$\Sigma f(x-A)$ $= -36$		$\Sigma f(x-A)^2$ $= 3728$		$\Sigma f(x-A)^3$ $= 1344$		$\Sigma f(x-A)^4$ $= 35,456$	

$$\mu_1 = \frac{\Sigma f(x-A)}{\Sigma f} = \frac{-36}{1000} = -0.036$$

$$\mu_2 = \frac{\Sigma f(x-A)^2}{\Sigma f} = \frac{3728}{1000} = 3.728$$

$$\mu_3 = \frac{\Sigma f(x-A)^3}{\Sigma f} = \frac{1344}{1000} = 1.344,$$

$$\mu_4 = \frac{\Sigma f(x-A)^4}{\Sigma f} = \frac{35456}{1000} = 35.456$$

Central moments are given by—

$\mu_1 = 0$

$\mu_2 = \mu'_2 - \mu'^2_1 = 3.728 - (-0.036)^2 = 3.7267$

$\mu_3 = \mu'_3 - 3\mu'_2\mu'_1 + 2\mu'^3_1$

$= 1.344 - 3(3.728)(-0.036) + 2(-0.036)^3$

$= 1.344 + 0.402624 - 0.000093312$

$\mu_3 = 1.7465$

$\mu_4 = \mu'_4 - 4\mu'_3\mu'_1 + 6\mu'_2\mu'^2_1 - 3\mu'^4_1$

$= 35.456 + 0.193536 + 0.028988 - 5.0388 \times 10^{-6}$

$\mu_4 = 35.6785$

Coefficient of skewness, $\beta_1 = \frac{\mu_3^2}{\mu_2^3}$

$$\beta_1 = \frac{(1.7465)^2}{(3.7267)^3}$$

$\beta_1 = 0.0589$ (Positive)

The curve is positively skewed.

Coefficient of kurtosis, $\beta_2 = \frac{\mu_4}{\mu_2^2} = \frac{35.6785}{(3.7267)^2}$

$\beta_2 = 2.569 (< 3)$, i.e., curve is platykurtic

Measure of Karl Pearson's skewness is given

$$\text{Mean} = A + \frac{\Sigma f(x-A)}{\Sigma f}$$

$$= 7 + \frac{(-36)}{1000} = 6.964$$

$$\text{Median} = l + \frac{2}{f} \cdot i = 6 + \frac{2}{389} \times 2$$

$= 6 + 0.437 \times 2 = 6.874$

$$\text{Standard Deviation (S.D.)} = \sqrt{\frac{\Sigma f(x-A)^2}{\Sigma f} - \left(\frac{\Sigma f(x-A)}{\Sigma f}\right)^2}$$

$$= \sqrt{\frac{3728}{1000} - \left(\frac{-36}{1000}\right)^2}$$

$= \sqrt{3.728 - 0.001296} = \sqrt{3.726} = 1.930$

Karl Pearson's coefficient of skewness

$$= \frac{3(\text{Mean} - \text{Median})}{\text{S.D}}$$

$$Sk = \frac{3(6.964 - 6.874)}{1.930}$$

$$Sk = \frac{0.27}{1.930} = 0.1398$$

Since $Sk > 0$

∴ Distribution is positively skewed.