Sol (2)

Section – 3

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
2-4	38	3	-4	-152	16	608	-64	-2432	256	9728
4-6	292	5	-2	-584	4	1168	-8	-2336	16	4672
6-8	389	7(A)	0	0	0	0	0	0	0	0
8-10	212	9	2	424	4	848	8	1696	16	3392
10-12	69	11	4	276	16	1104	64	4416	256	17664
	Σf=1000			Σf(x-A) =-36		Σf(x-A)² =3720		Σf(x-A)³ =1344		Σf(x-A)⁴ =35456

Cumulative frequency
38
330
719
931
1000

$\mu'_1 = \frac{\Sigma f(x-A)}{\Sigma f} = \frac{-36}{1000} = -0.036$

$\mu'_2 = \frac{\Sigma f(x-A)^2}{\Sigma f} = \frac{3728}{1000} = 3.728$

$\mu'_3 = \frac{\Sigma f(x-A)^3}{\Sigma f} = \frac{1344}{1000} = 1.344$

$\mu'_4 = \frac{\Sigma f(x-A)^4}{\Sigma f} = \frac{35456}{1000} = 35.456$

Central moments are given by -

$\mu_1 = 0$

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

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

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

$= 1.344 + 0.402624 - 0.000093312$

$\mu_3 = 1.7465$

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

$= 35.456 - 4(1.344)(-0.036) + 6(3.728)(-0.036)^2 - 3(-0.036)^4$

$= 35.456 + 0.193536 + 0.028980 - 5.0388 \times 10^{-6}$

$\mu_4 = 35.6785$

Coefficient of Skewness $\beta_1 = \frac{\mu^2_3}{\mu^3_2}$

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

$\beta_1 = 0.0589$ (positive)

The curve is positively skewed.

Coefficient of kurtosis $\beta_2 = \frac{\mu_4}{\mu^2_2} = \frac{35.6785}{(3.7267)^2}$

$\beta_2 = 2.569 (< 3)$ The curve is platy kurtic.

Measure of karl pearson skewness is given by-

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

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

median $= l + \frac{\frac{N}{2} - c.f}{f} \cdot i$ $\Rightarrow 6 + \frac{\frac{1000}{2} - 370}{383} \times 2$

$\Rightarrow 6 + 0.437 \times 2 = 6.074$

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

$\Rightarrow \sqrt{\frac{3720}{1000} - \left(\frac{-36}{1000}\right)^2}$

$\Rightarrow \sqrt{3.720 - 0.001296} = \sqrt{3.726} = 1.930$

Karl Pearson's coefficient of skewness $= \frac{3(\text{mean} - \text{median})}{S.D}$

$Sk = \frac{3(6.964 - 6.074)}{1.930}$

$SK = \frac{0.27}{1.930} = 0.1399$

Since $Sk > 0$

Distribution is positively skewed..