Problem: Calculate skewness and kurtosis from the following data:

Marks	No. of students(fi)	xi	fixi	$x_i - \bar{x}$	$f_i(x_i - \bar{x})^2$	$f_i(x_i - \bar{x})^3$	$f_i(x_i - \bar{x})^4$
10-20	5	15	75	-19.5	1901.25	-37074.375	722950.3125
20-30	10	25	250	-9.5	902.5	-8573.75	81450.625
30-40	12	35	420	.5	3	1.5	.75
40-50	8	45	360	10.5	882	9261	97240.5
50-60	5	55	275	20.5	2101.25	43075.625	883050.3125
Total	40		1380		5790	6689	1784692.5

$$Mean, \bar{x} = \frac{\sum fixi}{N} = \frac{1380}{40} = 34.5$$

We know that,

$$skewness, \sqrt{\beta_1} = \frac{\mu_3}{\sqrt{{\mu_2}^3}} = \frac{167.225}{\sqrt{(144.75)^3}} = \frac{167.225}{1741.517} = 0.096 > 0$$

So the given frequency distribution is positively skewed.

And $\beta_2 = \frac{\mu_4}{{\mu_2}^2} = \frac{44617.3125}{(144.75)^2} = 2.12 < 3$

So the distribution is leptokurtic.

$$\mu_2 = \frac{\sum f_i(x_i - \bar{x})^2}{N} = \frac{5790}{40} = 144.75$$

$$\mu_3 = \frac{\sum f_i(x_i - \bar{x})^3}{N} = \frac{6689}{40} = 167.225$$

$$\mu_4 = \frac{\sum f_i(x_i - \bar{x})^4}{N} = \frac{1784692.5}{40} = 44617.3125$$