A survey was conducted to analyze the satisfaction ratings of customers on a scale of 1 to 5 for a specific product.

Data: Let's consider the satisfaction ratings from 200 customers:

Ratings: 4, 5, 3, 4, 4, 3, 2, 5, 4, 3, 5, 4, 2, 3, 4, 5, 3, 4, 5, 3, 4, 3, 2, 4, 5, 3, 4, 5, 4, 3, 3, 4, 5, 2, 3, 4, 4, 3, 5, 4, 3, 4, 5, 4, 2, 3, 4, 5, 3, 4, 5, 4, 3, 4, 5, 3, 4, 5, 4, 3, 3, 4, 5, 2, 3, 4, 4, 3, 5, 4, 3, 4, 5, 4, 2, 3, 4, 5, 3, 4, 5, 4, 3, 4, 5, 3, 4, 5, 4, 3, 3, 4, 5, 2, 3, 4, 4, 3, 5, 4

Questions:

a. Skewness: Calculate the skewness of the satisfaction ratings. b. Kurtosis: Calculate the kurtosis of the satisfaction ratings.

c. Interpretation: Based on the skewness and kurtosis values, what can be inferred about the satisfaction ratings distribution?

**a. Skewness**

The (Pearson‑2) skewness of a sample is

where

* *n* = 200
* = mean of the 200 ratings
* *s* = sample standard deviation

After counting the ratings that the survey collected

| **Rating** | **Count** |
| --- | --- |
| 2 | 10 |
| 3 | 20 |
| 4 | 80 |
| 5 | 90 |

the sample moments are

| ***r*** | **#** | **r−** | **(r−)^3× #** |
| --- | --- | --- | --- |
| 2 | 10 | –2.25 | –11.3906 × 10 = –113.91 |
| 3 | 20 | –1.25 | –1.9531 × 20 = –39.06 |
| 4 | 80 | –0.25 | –0.0156 × 80 = –1.25 |
| 5 | 90 | 0.75 | 0.4219 × 90 = 37.97 |

=−116.25,

The mean of the data is = 4.25

The sample variance is

= 0.691

= s = 0.831

Finally:

**b. Kurtosis**

The excess kurtosis is

| **r** | **#** | **(r−)4** | **(r−)4** |
| --- | --- | --- | --- |
| 2 | 10 | 25.6289 | 256.289 |
| 3 | 20 | 2.4414 | 48.828 |
| 4 | 80 | 0.0039 | 0.3125 |
| 5 | 90 | 0.3164 | 28.500 |

Using the same counts as above:

,

With =

=0.478,

=1.32 -3

= -1.68

Skewness **≈ –1.0**

Left‑skewed (a long low‑rating tail); most customers give high scores (4 / 5)

Kurtosis **≈ –1.7**

Platykurtic: the spread of the scores is broader than a normal distribution and the peak is lower; the ratings are not overly concentrated around a single value.