

Enhanced Practice Question 1: Grouped Frequency Distribution in Sports Business Statistics

Context: A sports business analyst is reviewing the performance of a basketball team over the course of several seasons. The analyst wants to determine the variation in the number of points scored per game across 50 different games.

The points scored per game are grouped into the following intervals:

Points Scored (Class Interval)	Frequency (Number of Games)
50 - 54	5
55 - 59	10
60 - 64	12
65 - 69	8
70 - 74	9
75 - 79	6

Tasks:

- Class Boundaries:**
 - Find the **class boundaries** for each class interval.
 - Grouped Frequency Distribution:**
 - Construct a **grouped frequency distribution table** using the data provided.
 - Mean and Standard Deviation:**
 - Calculate the **mean** of the distribution.
 - Compute the **standard deviation** of the points scored per game.
 - Histogram:**
 - Construct a **histogram** using the class boundaries and frequencies.
 - Frequency Polygon:**
 - Construct a **frequency polygon curve** using the midpoints of the class intervals and the frequencies.
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Practice Question 2: Medical Statistics (Patient Recovery Time)

Context: A medical researcher is studying the recovery times of patients after undergoing a certain type of surgery. The recovery times (in days) of 60 patients are recorded and grouped into intervals.

The recovery times are summarized in the following table:

Recovery Time (Days)	Frequency (Number of Patients)
5 - 9	6
10 - 14	12
15 - 19	18
20 - 24	14
25 - 29	8
30 - 34	2

Tasks:

- Class Boundaries:**
 - Find the **class boundaries** for each recovery time interval.
 - Grouped Frequency Distribution:**
 - Construct a **grouped frequency distribution table**.
 - Mean and Standard Deviation:**
 - Calculate the **mean** recovery time.
 - Compute the **standard deviation** of the recovery time.
 - Histogram:**
 - Construct a **histogram** using the class boundaries and frequencies.
 - Frequency Polygon:**
 - Construct a **frequency polygon curve** using the midpoints of the class intervals and the frequencies.
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Practice Question 3: Business Statistics (Product Delivery Time)

Context: A business analyst is reviewing the delivery times for a set of products shipped to customers by a company. The delivery times (in days) for 70 orders have been recorded and grouped into intervals.

The delivery times are summarized in the following table:

Delivery Time (Days)	Frequency (Number of Orders)
1 - 5	8
6 - 10	14
11 - 15	20
16 - 20	15
21 - 25	9
26 - 30	4

Tasks:

- Class Boundaries:**
 - Find the **class boundaries** for each delivery time interval.
 - Grouped Frequency Distribution:**
 - Construct a **grouped frequency distribution table**.
 - Mean and Standard Deviation:**
 - Calculate the **mean** delivery time.
 - Compute the **standard deviation** of the delivery times.
 - Histogram:**
 - Construct a **histogram** using the class boundaries and frequencies.
 - Frequency Polygon:**
 - Construct a **frequency polygon curve** using the midpoints of the class intervals and the frequencies.
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Practice Question 4: Grouped Frequency Distribution from Raw Data (Employee Salaries)

Context: A human resources manager is analyzing the monthly salaries of 40 employees in a company. The manager has collected raw data on the salaries and wants to perform a statistical analysis to understand the distribution of salaries. Use $m=6$

The **raw salary data** (in USD) for the 40 employees is as follows:

Salaries (USD):

2850, 3020, 3100, 2950, 3150, 3300, 3500, 3600, 2950, 2900,
3100, 3200, 3250, 3400, 3600, 3700, 2800, 2700, 2550, 2400,
3350, 3200, 3450, 3550, 3800, 3900, 2950, 3100, 3650, 3850,
2750, 3050, 3450, 3600, 3150, 3300, 2750, 2450, 2600, 3200

Tasks:

1. **Convert Raw Data to Grouped Data:**
 - Convert the raw salary data into a **grouped frequency distribution** with a suitable class width (e.g., 300) and class intervals.
2. **Class Boundaries:**
 - Determine the **class boundaries** for each class interval.
3. **Grouped Frequency Distribution:**
 - Create the **grouped frequency distribution table** with the number of employees (frequency) in each salary class.
4. **Mean and Standard Deviation:**
 - Calculate the **mean** salary of the employees.
 - Compute the **standard deviation** of the salary distribution.
5. **Histogram:**
 - Construct a **histogram** using the class boundaries and frequencies.
6. **Frequency Polygon:**
 - Construct a **frequency polygon curve** using the midpoints of the class intervals and the frequencies.

Hints for Solution:

- **Step 1 (Convert Raw Data to Grouped Data):**
 - Select an appropriate class interval for the salary data. For example, a class width of 300 may be used.
 - Group the data into classes such as 2400–2699, 2700–2999, and so on.
- **Class Boundaries:** Subtract 0.5 from the lower limit and add 0.5 to the upper limit of each class interval.
- **Step 4 (Mean and Standard Deviation):** Use the midpoints of each class for the calculations.

$$\sigma = \sqrt{\frac{\sum f(x - \bar{x})^2}{N}}$$