CHAPTER 4

# Presentation of Data

CBSE Class 11 · Economics (Statistics, Part A) · Chapter 4

CBSE · Economics · Class 11

## WHAT THIS CHAPTER DOES

**A** Present data in three forms — textual, tabular and diagrammatic/graphic.

**B** Name the parts of a statistical table and the four types of classification.

Boards prep that builds confidence, not anxiety.

TODAY'S MISSION

# Today's mission

1. Present data in three forms — textual, tabular and diagrammatic/graphic.
2. Name the parts of a statistical table and the four types of classification.
3. Draw the right bar diagram and compute pie-chart angles (value/total x 360).
4. Build histograms, frequency polygons and ogives, and read the median.

WHY THIS MATTERS

# Why this chapter matters

1. It is the highest-scoring chapter of the Statistics paper because of its numerical questions.
2. Pie-chart angles and ogive-median are near-certain in any school paper.
3. Real-world link: every infographic, budget pie chart and trend line in the news is presentation of data.

TOPIC

A

# Three forms of presentation

THEOREM · LOAD-BEARING RESULT

# Textual, tabular and diagrammatic presentation

> After data is collected and organised, it must be PRESENTED so others can understand it. There are three forms: TEXTUAL (in sentences), TABULAR (in rows and columns), and DIAGRAMMATIC & GRAPHIC (bars, pies, histograms, graphs).

## STATEMENT

TEXTUAL presentation embeds figures in descriptive sentences — suitable only for small amounts of data. TABULAR presentation arranges data systematically in rows and columns (a

## WHY THIS MATTERS

- Different audiences and data sizes need different forms: text for a sentence or two of figures, tables for precise reference, and diagrams for instant visual impact and comparison.

## WATCH OUT FOR

**NOTE** Textual presentation is NOT just a neat table written out — it hides figures inside prose and makes comparison hard. Tables and diagrams are structured frameworks, not tidy paragraphs.

TOPIC

# When to use which form

## TEXTUAL PRESENTATION

In textual presentation the data is described within the body of a paragraph, with the figures woven into sentences. It suits situations where there are only a FEW figures and the emphasis is on explanation rather than comparison — for example, 'Out of 200 students, 120 passed

## TABULAR PRESENTATION

Tabular presentation arranges data systematically into ROWS and COLUMNS to form a statistical table with clearly defined parts. It makes the data compact, easy to compare across rows and columns, easy to refer to a specific figure, and ready for further statistical analysis. A table can

## DIAGRAMMATIC & GRAPHIC

Diagrammatic and graphic presentation converts data into visual figures such as bar diagrams, pie charts, histograms, frequency polygons, ogives and line graphs. Its great strength is IMPACT: a diagram conveys the overall picture and comparisons instantly, is attractive and

## CHOOSING THE FORM

The choice of form depends on the SIZE of the data and the PURPOSE. A handful of figures meant to be read in context suits textual form; a precise reference set that may be analysed further suits a table; and data meant to be compared or shown to a general audience suits diagrams and graphs

TOPIC

# B

# Tabular presentation — parts of a table

THEOREM · LOAD-BEARING RESULT

# Parts of a statistical table

> A well-made statistical table has standard PARTS: Title, Head-note, Stub (row headings), Caption (column headings), Body (the figures), Foot-note and Source.

## STATEMENT

TITLE — the heading describing the whole table (what, where, when). HEAD-NOTE — a note under the title giving the unit of measurement. STUB — the headings of the ROWS, on the

## WHY THIS MATTERS

- Naming the parts is a guaranteed short-answer question, and a properly parted table is what makes data easy to read, compare and reference.

## WATCH OUT FOR

**NOTE** The classic trap: STUB = ROW headings (left), CAPTION = COLUMN headings (top). Do not swap them. The TITLE is at the top; the BODY holds the actual numbers.

TOPIC

C

# Types of classification in a table

TOPIC

# Four bases of classification

### QUALITATIVE CLASSIFICATION

Qualitative classification groups data according to some ATTRIBUTE or quality that cannot be measured numerically, such as gender, literacy, religion or occupation. The population is divided into classes that POSSESS or do NOT possess the attribute (for example, literate vs

### QUANTITATIVE CLASSIFICATION

Quantitative classification groups data according to a characteristic that CAN be measured in numbers, such as height, weight, income or marks. The data is arranged into class intervals (for example, income groups 0-5000, 5000-10000, and so on), giving a frequency distribution.

### TEMPORAL CLASSIFICATION

Temporal (chronological) classification groups data according to TIME — by year, quarter, month or day. The time periods form the basis of classification, so the data becomes a TIME SERIES, for example India's population in 1991, 2001, 2011 and 2021, or a company's monthly sales.

### SPATIAL CLASSIFICATION

Spatial (geographical) classification groups data according to PLACE or location — by country, state, district, region or city. Each geographical unit forms a class, for example the production of wheat in Punjab, Haryana and Uttar Pradesh, or population by state. Spatial classification is ideal for

TOPIC

D

# Bar diagrams

TOPIC

# The four bar diagrams

### SIMPLE BAR DIAGRAM

A simple bar diagram represents ONE variable using a set of bars of EQUAL WIDTH whose HEIGHTS are proportional to the values, with equal gaps between them. It is used when each item has a single value to be compared, for example the population of five states or a firm's sales

### MULTIPLE BAR DIAGRAM

A multiple bar diagram shows TWO OR MORE related quantities for each category by placing several bars SIDE BY SIDE within each group, each shaded differently and explained by a key. It is the best choice when you want to COMPARE the components themselves across categories, for example

### COMPONENT (SUB-DIVIDED) BAR

A component or sub-divided bar diagram STACKS the parts of a total within a SINGLE bar, so the total height shows the grand total and each shaded segment shows a component's contribution. It is used when you want to show BOTH the total and its break-up together, for

### PERCENTAGE BAR DIAGRAM

A percentage bar diagram is a component bar in which every bar is drawn to the SAME total height representing 100%, and the segments show each component's PERCENTAGE share (percentage = value/total x 100). It is used to compare the COMPOSITION of

TOPIC

E

# Pie diagram

THEOREM · LOAD-BEARING RESULT

# Pie (circular) diagram — the 360-degree rule

> A pie diagram represents the components of a total as SLICES of a circle. The angle of each slice = (value of the component / total) x 360 degrees, and all angles add up to 360.

## STATEMENT

Steps: (1) find the TOTAL of all component values; (2) for each component compute the angle = (component value / total) x 360 degrees; (3) check the angles sum to 360; (4) draw a circle and mark the

## WHY THIS MATTERS

- The pie-angle calculation is the single most-tested numerical of the chapter — the formula and the 360 check are guaranteed marks.

## WATCH OUT FOR

**NOTE** Do NOT use the percentage as the angle. A 25% component is 25% of 360 = 90 degrees, not 25 degrees. If your angles do not sum to 360, you have an arithmetic error.

WORKED EXAMPLE

# Family monthly expenditure pie chart

1. Data (Rs): Food 4000, Rent 3000, Education 2000, Transport 1000, Savings 2000. Total = 4000+3000+2000+1000+2000 = 12000.
2. Food angle = (4000/12000) x 360 = 120 degrees; percentage = (4000/12000) x 100 = 33.3%.
3. Rent angle = (3000/12000) x 360 = 90 degrees (25%); Education = (2000/12000) x 360 = 60 degrees (16.7%).
4. Transport = (1000/12000) x 360 = 30 degrees (8.3%); Savings = (2000/12000) x 360 = 60 degrees (16.7%).
5. CHECK: 120 + 90 + 60 + 30 + 60 = 360 degrees. Percentages: 33.3 + 25 + 16.7 + 8.3 + 16.7 = 100. Draw the circle, mark the slices with a protractor and label each.

TOPIC

F

# Graphs of frequency distributions

TOPIC

# Histogram, polygon, curve, ogive

## HISTOGRAM

A histogram presents a CONTINUOUS frequency distribution as a series of rectangles drawn over the class intervals on the x-axis, with the frequency on the y-axis. The crucial features are that the bars TOUCH each other with NO GAPS (because the classes are continuous) and that the AREA of each rectangle

## FREQUENCY POLYGON

A frequency polygon is a line graph of a frequency distribution formed by plotting the frequency against the MID-POINT of each class interval and joining the points with STRAIGHT lines; the polygon is closed by extending it to the mid-points of the imaginary classes at both ends so it meets the x-axis. It can

## FREQUENCY CURVE

A frequency curve is the SMOOTHED version of a frequency polygon: instead of joining the mid-points with straight line segments, a smooth free-hand curve is drawn through them so that the area under the curve stays approximately equal to the area of the histogram. The smoothing removes the

## OGIVE (CUMULATIVE CURVE)

An ogive is the graph of a CUMULATIVE frequency distribution. The LESS-THAN ogive plots the less-than cumulative frequency against the UPPER class limit and slopes UPWARD to the right; the MORE-THAN ogive plots the more-than cumulative frequency against the

WORKED EXAMPLE

# Locating the median from two ogives

1. Take a frequency distribution, e.g., classes 0-10, 10-20, 20-30, 30-40 with frequencies 5, 8, 12, 5 (total N = 30).
2. LESS-THAN cumulative freq (plot vs UPPER limit): <10 -> 5, <20 -> 13, <30 -> 25, <40 -> 30. The curve rises upward.
3. MORE-THAN cumulative freq (plot vs LOWER limit): >0 -> 30, >10 -> 25, >20 -> 17, >30 -> 5. The curve falls downward.
4. Plot both curves on the same graph (x = class limits, y = cumulative frequency).
5. The two curves INTERSECT at one point; drop a perpendicular to the x-axis — that x-value is the MEDIAN (here it falls in the 20-30 class).

THEOREM · LOAD-BEARING RESULT

# Time-series (arithmetic) line graph

> A time-series or arithmetic line graph shows how a variable changes over TIME: time is taken on the x-axis and the value of the variable on the y-axis, and the plotted points are joined by line segments to reveal the trend.

## STATEMENT

Used for TEMPORALLY classified data (a time series). The x-axis carries equal time intervals (years/months), the y-axis carries the variable on an arithmetic (natural) scale, and successive points are

## WHY THIS MATTERS

- It is the natural partner of temporal classification and a common short numerical/graph question
- trends are read directly off the slope of the line.

## WATCH OUT FOR

**NOTE** Use equal spacing on the time axis and a uniform arithmetic scale on the y-axis, otherwise the trend is distorted (a classic source of the 'misleading graph' criticised in Chapter 1).

TRY IT · SOLVE BEFORE YOU PEEK

# Quick self-test (60 seconds)

Work it out before you flip the answer.

**SOLUTION**

1. Q1. Name the three forms of presentation and one use of each.
2. Q2. Which table part is for rows and which for columns? Name all parts.
3. Q3. A component is 5000 out of a total 20000 — what is its pie-slice angle?
4. Q4. Give two differences between a histogram and a bar diagram, and explain how the median is found from ogives.
5. Cover the slide and answer aloud before checking the Recap below.

TOPIC

# Histogram vs bar diagram

**TRAP → TRUTH**

× **MISTAKE** A histogram and a bar diagram are the same thing — both are just vertical bars.

✓ **CORRECT** They are DIFFERENT. A BAR DIAGRAM shows discrete/categorical data with EQUAL GAPS between bars; only the HEIGHT matters and bars can be reordered. A HISTOGRAM shows a CONTINUOUS frequency distribution with NO GAPS between bars (bars touch), drawn over class intervals on a continuous x-axis; AREA (width x height) represents frequency and bars cannot be reordered.

TOPIC

# Less-than vs more-than ogive

**TRAP → TRUTH**

× **MISTAKE** Less-than and more-than ogives are plotted the same way.

✓ **CORRECT** They differ in the cumulative frequency used and the point plotted. A LESS-THAN ogive plots less-than cumulative frequency against the UPPER class limit and rises UPWARD to the right. A MORE-THAN ogive plots more-than cumulative frequency against the LOWER class limit and falls DOWNWARD to the right. The x-coordinate of the point where the two curves INTERSECT gives the MEDIAN.

TOPIC

# Pie diagram angle

**TRAP → TRUTH**

× **MISTAKE** In a pie chart you use percentage as the angle directly (e.g., 25% means a 25-degree slice).

✓ **CORRECT** The slice ANGLE = (value / total) x 360 degrees, NOT the percentage. A component that is 25% of the total takes 25% of 360 = 90 degrees, not 25 degrees. All angles MUST add up to 360 degrees. (Percentage = value/total x 100 is a separate calculation used for percentage bar diagrams.)

TOPIC

# Component vs multiple bar

**TRAP → TRUTH**

× **MISTAKE** A multiple bar diagram and a component (sub-divided) bar diagram are interchangeable.

✓ **CORRECT** A MULTIPLE bar diagram places the sub-categories SIDE BY SIDE as separate bars (best for COMPARING components). A COMPONENT (sub-divided) bar diagram STACKS the sub-categories within ONE bar so the total height shows the grand total (best for showing the TOTAL and its parts together). They answer different questions.

TOPIC

# Frequency polygon vs curve

**TRAP → TRUTH**

× **MISTAKE** A frequency polygon and a frequency curve are drawn identically.

✓ **CORRECT** A FREQUENCY POLYGON joins the mid-points of the tops of histogram bars with STRAIGHT lines (and is closed to the x-axis at both ends). A FREQUENCY CURVE is the SMOOTHED, free-hand version of the polygon — a smooth curve instead of straight segments. Polygon = straight lines; curve = smoothed.

TOPIC

# Textual vs tabular presentation

**TRAP → TRUTH**

× **MISTAKE** Tabular presentation is just textual presentation written more neatly.

✓ **CORRECT** TEXTUAL presentation embeds the figures inside SENTENCES/paragraphs (good for small data, poor for comparison). TABULAR presentation arranges data in ROWS and COLUMNS with defined parts (title, stub, caption, body), which makes comparison, reference and further analysis far easier. A table is a structured framework, not merely tidy prose.

TOPIC

# Caption vs stub

**TRAP → TRUTH**

× **MISTAKE** The 'stub' is the heading at the top of the columns.

✓ **CORRECT** In a table, the CAPTION is the heading of the COLUMNS (across the top), while the STUB is the heading/description of the ROWS (down the left). Mixing them up loses marks in 'parts of a table' questions. The TITLE is at the very top, the BODY holds the actual figures, and head-notes/foot-notes/source sit around the table.

TOPPER TEMPLATE · MARK-BY-MARK

# 4-6 mark: 'Calculate the angles for a pie diagram from the given values.'

| | | |
|---|---|---|
| 1 | **STATE THE FORMULA + FIND THE TOTAL** 1 m | The angle of each slice = (value of the component / total of all values) x 360 degrees. First add all the component values to get the TOTAL, since every angle is a fraction of 360 degrees. |
| 2 | **COMPUTE EACH ANGLE IN A TABLE** 2 m | Make a working table with columns: Item \| Value \| Angle = (value/total)x360. Compute each angle, e.g., if Food = 90 out of total 360, angle = (90/360)x360 = 90 degrees. Show the calculation for EVERY component, keeping figures aligned. |
| 3 | **CHECK THE SUM = 360 + DRAW** 1 m | ADD all the angles and confirm they total exactly 360 degrees (a built-in accuracy check). Then draw a circle, mark the slices in order with a protractor starting from 12 o'clock clockwise, and label each slice with its item name and value/percentage. |

TOPPER TEMPLATE · MARK-BY-MARK

# 3-4 mark: 'Name and explain the parts of a statistical table.'

| | | |
|---|---|---|
| 1 | **TITLE + HEAD-NOTE** 1 m | TITLE: the heading at the very top describing the contents of the whole table (what, where, when). HEAD-NOTE: a note below the title giving the unit of measurement (e.g., 'in lakh rupees'). |
| 2 | **STUB + CAPTION** 1 m | STUB: the headings of the ROWS, down the left-hand column, describing what each row contains. CAPTION: the headings of the COLUMNS, across the top, describing what each column contains. Stub = rows, Caption = columns. |
| 3 | **BODY + FOOT-NOTE/ SOURCE** 1 m | BODY: the main part containing the actual numerical figures, where each cell is fixed by its row and column. FOOT-NOTE: clarifies anything special; SOURCE: states where the data came from, given below the table. |

TOPPER TEMPLATE · MARK-BY-MARK

# 3-mark: 'Distinguish between a histogram and a bar diagram.'

| | | |
|---|---|---|
| 1 | **TYPE OF DATA** 1 m | A BAR DIAGRAM represents DISCRETE or categorical data (e.g., production of different states). A HISTOGRAM represents a CONTINUOUS frequency distribution arranged in class intervals. |
| 2 | **GAPS BETWEEN BARS** 1 m | In a bar diagram the bars are SEPARATED by EQUAL GAPS, because the categories are distinct. In a histogram the bars TOUCH each other with NO GAPS, because the class intervals are continuous. |
| 3 | **WHAT REPRESENTS THE VALUE** 1 m | In a bar diagram only the HEIGHT (length) of the bar shows the value, and bars can be reordered. In a histogram the AREA of each bar (width x height) represents the frequency, and the bars cannot be reordered. |

PYQ PATTERNS

# Top PYQ patterns to drill

| | | |
|---|---|---|
| #1 | Calculate the angles for a pie diagram from given values (degree = value/total x 360). (4-6 marks) | Most school papers + SQP |
| #2 | Name and explain the parts of a statistical table. (3-4 marks) | Annual |
| #3 | Distinguish between a histogram and a bar diagram. (3 marks) | Frequent |
| #4 | Construct a less-than and a more-than ogive and locate the median. (4-6 marks) | Annual |
| #5 | Explain the four types of classification used in tabulation (qualitative, quantitative, temporal, spatial). (3-4 marks) | Unit tests |

RECAP · MEMORISE THESE

# Recap

1 Three forms + table — Textual (sentences), tabular (rows & columns: title, stub=rows, caption=columns, body, source), diagrammatic/ graphic. Four classifications: qualitative, quantitative, temporal, spatial.

2 Diagrams — Bar diagrams: simple, multiple (side by side), component (stacked), percentage (100% tall). Pie angle = value/total x 360 (sum to 360); percentage = value/ total x 100.

3 Frequency graphs — Histogram (continuous, bars touch, area=frequency) vs bar (gaps, height). Polygon = straight lines through mid-points; curve = smoothed. Less-than & more-than ogives intersect at the

WHAT'S NEXT

# What's next

→ Chapter 5 — Measures of Central Tendency (mean, median, mode).

→ Sit the 15-MCQ Quick Drill below.

→ Then attempt the full School-Pattern Paper — 30 marks (with a pie numerical).

# You can now turn raw data into tables, bars, pies and ogives.

Master the pie angle and the ogive-median and these marks are yours.

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