

GRADE 11 STUDY GUIDE | 2024

Data Handling and Probability

Mathematical Literacy

1. Collecting and Organising Data

- Discrete data: can only take specific values; counted (number of people, goals scored)
- Continuous data: can take any value in a range; measured (height, temperature, mass)
- Categorical data: categories with no numerical order (colours, types of food, Yes/No)
- Frequency table: lists values and how often each occurs; can add cumulative frequency column
- Grouped data: data organised into class intervals when range is large

2. Measures of Central Tendency

Mean: sum of all values / number of values

Median: middle value when data is ordered (if n is even: average of two middle values)

Mode: value that occurs most often

Example: Data: 3, 5, 5, 7, 9, 10, 10, 10, 12

Mean = $(3+5+5+7+9+10+10+10+12) / 9 = 71/9 = 7.9$

Median = 9 (5th value of 9)

Mode = 10 (appears 3 times)

3. Spread of Data

Range = Maximum value - Minimum value

Interquartile Range (IQR) = Q3 - Q1

Q1 (lower quartile) = median of lower half

Q3 (upper quartile) = median of upper half

4. Representing Data

- Bar graph: comparing categories; bars do not touch
- Histogram: continuous data in class intervals; bars TOUCH; y-axis = frequency
- Pie chart: shows proportions; angles proportional to frequencies
- Line graph: shows trends over time; use when data is continuous over time
- Scatter plot: shows relationship between two variables; line of best fit shows trend
- Box-and-whisker plot: shows min, Q1, median, Q3, max; reveals spread and skewness

5. Probability

Probability of event = Number of favourable outcomes / Total number of possible outcomes

P(event) always between 0 (impossible) and 1 (certain)

- Complementary events: $P(\text{not } A) = 1 - P(A)$
- $P(A \text{ or } B)$ for mutually exclusive events: $P(A) + P(B)$
- Tree diagram: useful for multi-stage experiments; multiply along branches

Example: Bag has 3 red, 4 blue, 3 green beads. Probability of drawing red?

$$P(\text{red}) = 3 / (3+4+3) = 3/10 = 0.3 = 30\%$$