

Statistics and probability

Edexcel IGCSE Maths (4MA1) · Knowledge organiser

KEY DEFINITIONS

Statistical Measures

Mean = total $\div$ count. Median = middle when ordered. Mode = most common. Range = max – min.

Histograms and Frequency Density

In a histogram the bar AREA shows the frequency: frequency density = frequency $\div$ class width.

Probability

Multiply along the branches of a tree diagram, add the paths you want. Without replacement, the numbers on the second branches change.

KEY FORMULAS

Mean from a table $\bar{x} = \frac{\sum fx}{\sum f}$

Median position ($n \frac{n+1}{2}$ th value values)

Interquartile range $Q_3 - Q_1$

Histogram frequency density = $\frac{\text{frequency}}{\text{class width}}$

Probability $P(\text{not } A) = 1 - P(A)$;
expected frequency = $n \times P(A)$

Mutually exclusive $P(A \text{ or } B) = P(A) + P(B)$

Any two events $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

Independent $P(A \text{ and } B) = P(A) \times P(B)$

Conditional $P(B | A) = \frac{P(A \cap B)}{P(A)}$

Tree diagrams: multiply along branches, add the outcomes you want; without replacement, change the second branch

YOU SHOULD BE ABLE TO...

- Classify data as qualitative or quantitative and discrete or continuous, and complete and interpret two-way tables.
- Find the mean, median and mode from a frequency table of discrete data, and interpret what they show about the data.
- Calculate frequency density as frequency $\div$ class width and draw histograms for grouped continuous data with unequal class widths.
- Complete cumulative frequency tables from grouped data and draw cumulative frequency curves, plotting at the upper class boundaries.
- Estimate probabilities from experiments using relative frequency, and use probabilities to calculate expected frequencies for a number of trials.
- Find conditional probabilities from two-way tables and Venn diagrams, restricting attention to the given event before calculating the probability.

WORKED EXAMPLE

A bag has 3 red and 5 blue counters. Two are taken without replacement. P(both red)?

1. $3/8 \times 2/7 = 6/56 = 3/28$.

COMMON MISTAKES

- ✗ Histograms: reading heights as frequencies
- ✗ Cumulative frequency plotted at midpoints
- ✗ Forgetting to order data before finding the median
- ✗ Pie-chart angles not totalling 360°