

Probability distributions

N2 Understand and use the Normal distribution as a model; find probabilities using the Normal distribution.

Link to histograms, mean, standard deviation, points of inflection and the binomial distribution.

N3 Select an appropriate probability distribution for a context, with appropriate reasoning, including recognising when the binomial or Normal model may not be appropriate.

For a brief commentary on this content go to the [MEI outline SoW](#).

Pre-requisites

- GCSE/AS Data processing, presentation & interpretation: Histograms and cumulative frequency
- AS The binomial distribution: Understanding the model

Teaching it!

- **Coming soon**** A series of [videos](#) designed to support students on this topic.
- [Normal curves](#): A matching task making visual links between probabilities, areas under Normal curves and the cumulative Normal function.
- [Standardising the normal distribution](#) & [Normal approximation to the binomial](#): Two GeoGebra applets helping students picture the Normal Distribution.
- [A collection of activities from Nrich](#) about the Normal distribution.
- Interactive Normal Distributions from [Desmos](#) and the [Geogebra probability calculator](#).
- Casio graphic calculator student task: [Normal Distribution](#).

Common student errors

- Using the height of the normal curve (Normal probability distribution) to find $P(X = a)$.
- Not dealing clearly with Normal data that produces negative z-scores e.g. 5% were less than, say, 10.76 so $z = 1.96$ rather than -1.96 .
- Confusing probabilities with z-scores.

Getting them thinking

- Make up three questions that show you understand how the Normal Distribution can be used in context.
- Change one number in the following statement to make it true:
If $X \sim N(100, 15^2)$ then $P(X < 90) = 0.1$
- How do the proportions of the normal distribution correspond to measurement of outliers, such as the $2 \times$ SD rule or $1.5 \times$ IQR?
- A teacher sets a test and plans to give grades {A,B,C,D,E,U} based on a normal curve with the mean and standard deviation of the students' results. Suggest how the teacher should construct the grade boundaries. Is this a fair way to grade a test?