The Sutton Academy

Knowledge Rich Curriculum Plan

Year 12/13 stats - Statistical distributions

Lesson/Learning Sequence	Intended Knowledge: *Students will know that…*	Tiered Vocabulary	Prior Knowledge: *In order to know this students, need to already know that…*	Assessment
LO: To learn about to probability distributions.	• *Students will know that a probability distribution fully describes the probability of any outcome in the sample space.* • *Students will know that a probability distribution can be described as a probability mass function.* • *Students will know that a probability distribution can be described as a table.* • *Students will know that a probability distribution can be described as a diagram.* • *Students will know how to represent probabilities in a probability mass function.* • *Students will know that for a random variable X you can write* $\sum P(X = x) = 1$ *for all x.* • *Students will know how to use a probability mass function to find probability.* • *Students will know how to solve problems given a probability distribution.*	Random variable – Is a variable whose outcome depends on a random event.	Students will need to be able to calculate basic probability	
Lo : To learn how to use the binomial distribution	• *Students will know that you can model X with binomial distribution B(n,p) if* *-There is a fixed number of of trails, n.* *- There two possible outcomes (success and failure)* *- There is a fixed probability of success, p.* *- The trials are independent of each other.* • *Students will know that if a random variable X has binomial distribution B(n,p) then its probability mass function is given by* $p(X = r) = \binom{n}{r} p^r (1-p)^{n-r}$ • *Students will know how find probabilities in the form (P = r)* • *Students will know how to use the formula to find probabilities in the form* $P(X \leq r)$		Studnets need to know how to use the chose function.	
Lesson Objective: To learn how to draw and use the properties of the normal distribution.	• *Students will know the normal distribution has a bell shape with asymptotes at each end* • *Students will know that the normal distribution is symmetrical (mean = median =mode)* • *Students will know that the area under the curve is equal to one.* • *Students will know that IF X is normally distributed random variable, you write* $X \sim \mathcal{N}(\mu, \sigma^2)$. *Where μ= mean and σ²= Variance.* • *Students will know tat 68% of the data lies within tone standard deviations of the mean.* • *Students will know that 95% of the data lies within two standard deviations of the mean.* • *Students will know that nearly all of the data (99.7%) lies within three standard deviations of the mean* •		Students will have knowledge about mean and variance. Students will know what a continuous random variable.	

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Lesson objective: To learn how to find probabilities from a normal distribution.	• *Students will know to always sketch a graph to check that their answer makes sense.* • *Students will know how to use their calculators to find probabilities of normal distribution.* • *Students will know that you can use either > and ≥ interchangeably with a continuous distribution.* •		Students will need to know how to find probabilities. Students need to know how to find probabilities using binomial distribution.	
Lesson objective: To learn how find the inverse normal distribution function.	• *Students will know that for a given probability p, you can use your calculator to find a value of a such that P(X<a) = p. This is called the inverse normal distribution.*		Students will need to know how to find probabilities using a calculator for normal distribution.	
Lesson objective: To learn to standardise the normal distribution.	• *Students will know that the standard normal distribution has mean 0 and standard distribution 1.* • *Students will know that if* $X \sim N(\mu, \sigma^2)$ *is a normal distribution with mean* μ *and standard deviation* σ *then you can code X using the formula* $Z = \frac{X-\mu}{\sigma}$ *where the resulting z-values will be normally distributed with mean 0 and standard deviation 1.* • *Students will know that for the standard normal curve* $Z \sim N(0, 1^2)$ *the probability p(Z < a) is sometimes written as* $\Phi(a)$. • *Students will know how to find the probabilities of a standardised normal distribution.* • *Students will know how to find a z value given a probability.*		Students need to know how to use the normal distribution to find probabilities. Students need to know the shape of a normal distribution curve	
Lesson objective : To learn how to find the mean and standard deviation.	• *Students will be able to find the mean given the probability.* • *Students will be able to find the standard deviation given the probability* • *Students will be able to find the mean and standard deviation given two probabilities.*		Students will need to know how to standardise a normal distribution Students will need to know how to find a Z value	

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Lesson objective : To learn how to approximate a binomial distribution.	• *Students will know that if n is large and p is close to 0.5, then the binomial distribution X~(n, p) can be approximated by the normal distribution if* $X \sim N(\mu, \sigma^2)$ *where* $\mu = np$ *and* $\sigma = \sqrt{np(1-p)}$ • *Students will know to approximate the binomial distribution using normal distribution.* • *Students will know how to estimate probabilities by approximating probabilities* • *Students will know how to apply a continuity correction.*		Students need to know how to derive a binomial distribution. Students need to know how to find probabilities using normal distributions.	