"**revision makes dreams come true.**"

Statistics 1 Hints and Brief Pointers

Graphs

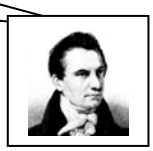
- When drawing a histogram, if the widths are unequal, find the frequency density and draw this on the vertical axis.
- When drawing a cumulative frequency graph, plot the value at the END of the group.
- Don't forget the three types of skewness; Postive – more data at the start, Symmetrical – more data in the middle and negative skew – more data at the end.

Data and Calculations

- Standard Deviation formula is $S = \sqrt{\frac{\sum x^2 - n\bar{x}^2}{n-1}}$.
- When identifying outliers from the mean and standard deviation, it is an outlier if it is more than 2 standard deviations away from the mean on either side.
- When finding outliers from the inter-quartile range, A value is an outlier if its distance from the nearer quartile is greater than 1.5 times the inter-quartile range.

Permutations and Combinations

- Permutations order is important e.g. finishing a race.
- Combinations – the order is not important e.g selecting people, national lottery.
- When you have more than one combination e.g. choosing 4 men and 2 women **MULTIPLY** the combinations.



Probability

- We need to know and use the following three formula:

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

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

  Not Mutually Exclusive (can happen at same time):

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

- $P(A')$ is the notation for not happening.

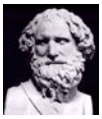
- We need to know the following visual representations: Tree Diagram, Venn Diagram, Table sample space diagram.

- REMEMBER conditional probability – the word GIVEN. The denominator then changes to what has definitely happened i.e. the given condition.

Expectation and Variance from Tables

- EXPECTATION E(X) = Number $\times$ Associated Probability then ADD together.

- VARIANCE Var(X) = Number squared $\times$ Associated Probability then ADD together then SUBTRACT the expectation squared.



Binomial Distribution and Hypothesis Testing

- When using the tables, remember which number to read off from the table

  $P(X \leq$ Read off the number in the tables

  $P(X <$ Read off the number before in the tables

  $P(X =$ Number in table – number before it

  $P(X >$ 1 – Number in table

  $P(X \geq$ 1 – Number before in tables

- The binomial formula for values not in the tables is

  $P(X = r) = {}^{n}C_{r} \times p^{r} \times (1-p)^{n-r}$ where r is what we want, n is the number of trials and p is the probability of success.

- For hypothesis testing there are 3 H1: P< (read off the start of the table), P> (read of the end of the table) and P $\neq$ (read off the start **and** end of the table – REMEMBER to HALVE the significance level).