FRQ What Are They Asking Me?

I. Calculator Tips by Stats Medic

II. One var-stats: Often will ask you to describe a distribution or compare distributions. This is when you will:
   A. CUSS – CENTERS (mean or median), UNUSUALNESS (gaps, outliers, clusters), SHAPE data **appears** (uniform, symmetric, bimodal, skewness), SPREAD (range, variance, IQR)
   B. BS- Be Specific and state in context

III. Two Var-stats: Often asks to compare/ describe relationships between 2 variables.
   A. Address direction, outliers, form, strength in context
   B. Often uses LINEAR REGRESSION

IV. Sampling Methods/Experimental Design: Often asked how to carry out an experiment or to improve from a given prompt. Recipes cards on pg 32,34, 36 in spiral volume I

V. Probability: likelihood of an event/s
   A. Conditional Probability- often describes/ displays results of events and asks for the probability of events happening together- MAKE A CONTINGENCY TABLE

Conditional Probability & Independence-if $P(A \mid B) = P(A)$ then the events are independent

Or if $\frac{P(A \cap B)}{P(B)} = P(A)$ **then independent.** **Also if** $\frac{P(A \cap B)}{P(A)} = P(B)$ **then independent**

   B. Geometric Distributions- **# of Trials are UNKNOWN**, success or failure only, each trial is independent.

Equation: $q^{k-1}p$ **k is the number of trials until the 1st success**

Mean or E(X) $\mu = \frac{1}{p}$ **Variance or Var(X)** $\sigma^2 = \frac{q}{p^2}$ **Standard deviation** $\sigma = \frac{\sqrt{q}}{p}$

Geometrics are usually phrased as:
- What is the probability that the **1st** success will occur on a given trial (Geometric PDF)
- What is the probability that the **1st** success will occur no later than or by (Geometric CDF)

   C. Binomial Distribution- **#Of Trials Is Pre-Determined/Fixed**, success and failure outcomes only, each trial is independent.

Mean or E(X)=np **Variance or Var(X)** $\sigma^2 = npq$ **Standard deviation** $\sigma = \sqrt{npq}$

Binomials are usually phrased as:
- What is the probability of some number of successes in a given number of trials? (Binomial PDF)
- What is the probability of at least some number of successes in a given number of trials? (Binomial CDF) usually **1-**Binomial CDF
- What is the probability of no more than some number of successes in a given number of trials? (Binomial CDF)
- What is the probability that the number of successes in a given number of trials are between 2 values? (Binomial CDF)--**(Binomial CDF of larger value) - (Binomial CDF smaller value)**

Equation: $\sum_{k=0}^{n} \binom{n}{k} p^k q^{n-k} = \frac{n!}{k!(n-k)!} p^k q^{n-k}$

- **n is the number of trials**
- **k is the number of successes**

D. Normal Distribution Probability (Z Score)- you know the standard deviation of the population

$$z = \frac{\bar{x}-\mu}{\frac{\sigma}{\sqrt{n}}} \text{ or } z = \frac{x-\mu}{\sigma}$$

see page 100 spiral volume I

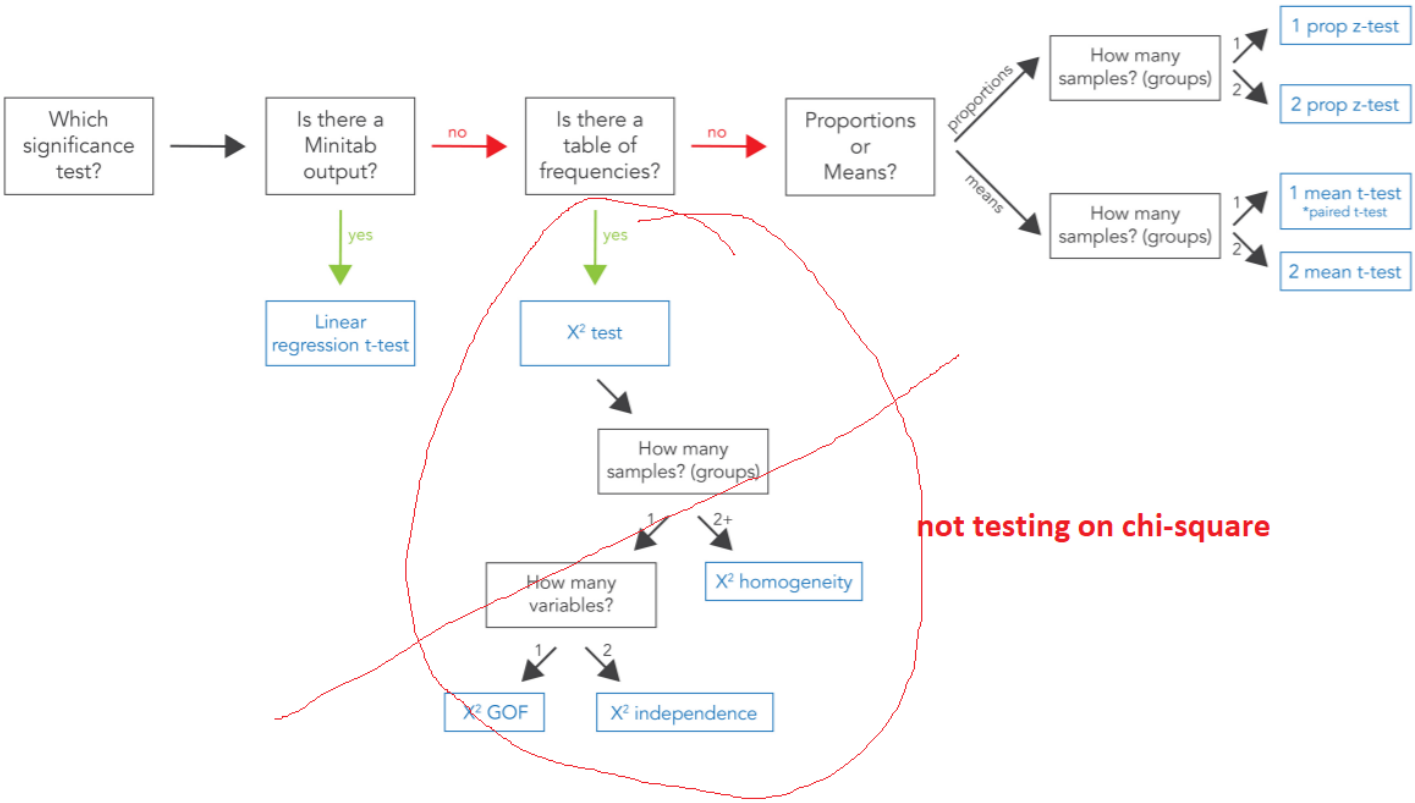
Critical Distinction: Do not confuse the Law of Large numbers with the Central Limit Theorem

- **Law of Large numbers**: as the number of trials increases the percentage of successes moves closer to the expected number of successes-the theoretical number of successes.
- **Central Limit Theorem**: For a large sample the distribution of the means is normal with the following statistics $\mu = \bar{x}$ and $\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$

E. T-distribution

When to use the T-Distribution

1. When the data is **nearly normal (unimodal & symmetric)** and σ the standard deviation of the pop. is not known and there is no clear skewness or outliers it is ok to have a sample size less than 30.
2. When the σ standard deviation of the population is not known and the underlying data does not follow a normal curve the sample size must be 30 or larger.



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