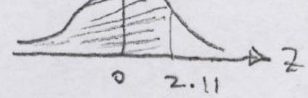
Reading-off From statistical Tables

1. Standard Normal $Z \sim N(\mu=0, \sigma=1)$ PP 737-738

1- Find $P[Z \leq 2.11]$, use first column and first row to locate Z. Left tail probability is inside the Table.

$P[Z \leq 2.11] = .9826$



2- Find $P[1 \leq Z \leq 2]$.

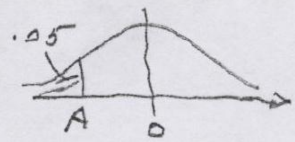
$.9772 - .8413 = 14\%$

3- Find $P[Z \geq 2]$, $P[Z \geq 2] = 1 - P[Z \leq 2] = 1 - .9772 = 2\%$

4- what is A value for which $P[Z \leq A] = .05$

A is called a critical value. Look inside the Table to find a number close to probability .05, it is

-1.645, It is left tail



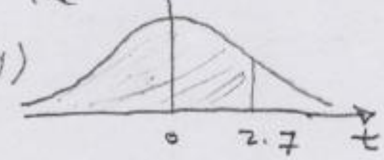
Get the exact value from the last row of the T-table (PP 739-740). It is $A = -1.6449$

3. Critical Values of T-table PP. 739-740

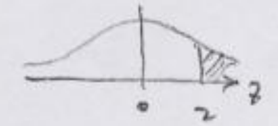
1- Suppose a sample size of $n = 10$ is taken, This means $d.f. = n-1 = 9$, what is the critical value A for which $P[T_9 \leq A] = .05$,

$A = -1.8331$

2- Compute $P[T_9 \le 2.7] = ?$, looking inside The table (in d.f. = 9 Row) we take The closest number 2.8214, This give The Probability of 0.99 (approximately)



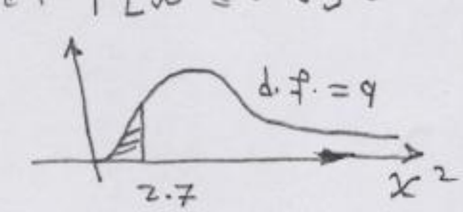
3- suppose $n=140$ what is $P[T \geq 2]$, look at The last row, look for a close number to 2 it is 1.96, There fore $P[T \geq 2] \simeq P[T \geq 1.96] = .025$
For exact value, use Z table
$P[Z \geq 2] = 1 - .9772 = 0.0228$



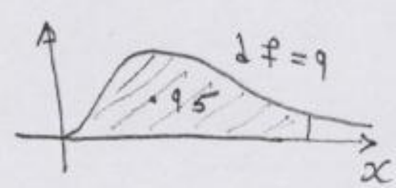
Result 1: $T \longrightarrow Z$ for large n

∴ Critical values for χ^2 (ki-square), it is not square of anything, it is a name.

1- Given sample size of $n=10$, what is $P[\chi^2 \le 2.6]$
use d.f. $= n-1 = 9$ row select $P[\chi^2 \le 2.6] \simeq$
$P[\chi_9^2 \le 2.7] = 0.025$



2- For The same problem, find The critical value A, $P[\chi_9^2 \le A] = 0.95$
$A = 16.919$ directly from The Table, row df = 9



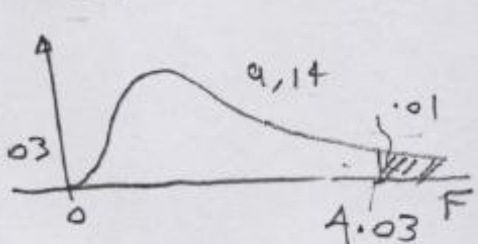
D. Critical values of F (pp 742-745)

1- Having a sample size $n_1 = 10$ from one Normal population and $n = 15$ from another one:

what is A, $P[F_{9,14} \geq A] = .01$

Directly from the table

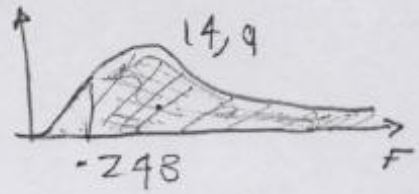
The critical value is $A = 4.03$



2- What is the critical value of B

$$P[F_{14,9} \geq B] = 0.99, \quad B = ?$$

Result 2: $F_{n_1, n_2, \alpha} = \dfrac{1}{F_{n_2, n_1, 1-\alpha}}$



$$= \frac{1}{F_{9,14,.01}} = \frac{1}{4.03} = 0.248 = B$$

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6. part of page 4/4

$$F \longrightarrow T$$

$$F_{1, n_2, \alpha} \longrightarrow t^2_{n_2, \alpha/2}$$

$$F_{1,25,.05} = 4.25 = (2.0595)^2$$

Some Common Relationships among Tables

1. $T \longrightarrow Z$, for large sample sizes

2. $F_{n_1, n_2, \alpha} \longrightarrow 1/F_{n_2, n_1, 1-\alpha}$, useful for left tail probabilities

3. $\chi^2 \longrightarrow Z$, $\sqrt{2\chi_n^2} - \sqrt{2n-1} \sim Z$

Let $\chi^2_{n=30, .05} = 43.773$

Then $\sqrt{2\chi^2} - \sqrt{2n-1} = 9.36 - 7.68$

$= 1.68 = Z_{.05}$

4. $nF_{n, \infty, \alpha} \longrightarrow \chi^2_{n, \alpha}$

$F_{9, \infty, .05} = 1.88$, $9F_{9, \infty, .05} = 16.92$

$= \chi^2_{9, .05}$

5. If $X \sim$ Any Homogenous population with mean μ and standard deviation σ, Then $\overline{X}$ for sample size of n say larger Than 30, is distributed as $N(\mu, \sigma/\sqrt{n})$