ANOVA one-way is ~~[illegible]~~ a hypothesis test where

$H_0: \mu_0 = \mu_1 = \dots = \mu_m$

H_1: not H_0

~~Z~~ Z-stat in ANOVA

Z-stat equiv is F-stat

$$F\text{-stat} = \frac{\text{mean sum of sqs btwn (SSB)}}{\text{mean sum of sqs within (SSW)}}$$

let = mSSB ; let = mSSW

ANOVA assumptns
1. samples are independent
2. each sample is fr. a normal. dist. popn
3. The popn st dev. of all grps are equal $\Leftrightarrow$ homoscedasticity

$\Rightarrow F = \frac{mSSB}{mSSW}$

$F \sim F\text{-distn}(SSBdf, SSWdf)$

F-stat has an F-distn

mssB & mssW each have Chi-distn

$$SSB = \sum_{\text{all } m} \sum_{\text{all samples in grp } m} (x_i - \bar{X}_m)^2 \; ; \; SSW = \sum_{\text{all } m} n_m (\bar{X}_m - \bar{X}_{total})$$

n_m = size of grp m

eg

grp→	A	B	C
Sample one	X_{1A}	X_{1B}	X_{1C}
two	X_{2A}	⋮	⋮
three			
	$X_{n_A A}$	$X_{n_B A}$	$X_{n_C A}$

SSW is looks @ diff. w/in a grp

$$SSW = (X_{1A} - \bar{X}_A)^2 + \dots (X_{n_A A} - \bar{X}_A)^2 + \sum (X_{iB} - \bar{X}_B)^2 + \sum (X_{iB} - \bar{X}_B)^2$$

SSB is looks @ diff btwn grps

$$n_A (\bar{X}_A - \bar{X}_{TOTAL})^2 + \dots + n_C (\bar{X}_C - \bar{X}_{total})^2$$

Khan Academy is awesome!

$$mSSB = \frac{SSB}{df_B} = \frac{SSB}{N-1} \; , \; mSSW = \frac{SSW}{df_W} = \frac{SSW}{N-K}$$

df = degrees of freedom ; df has to do w/ how many values you can mv & still ~~[illegible]~~ fig out stat.