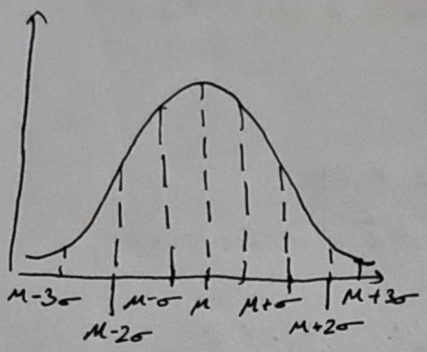
3) Consider following scheme



	Expected out of 600
A if $\in [\mu+2\sigma, +\infty)$	13.8
B if $\in [\mu+\sigma, \mu+2\sigma]$	81.6
C if $\in [\mu-\sigma, \mu+\sigma]$	409.2
D if $\in [\mu-2\sigma, \mu-\sigma)$	81.6
F if $\in (-\infty, \mu-2\sigma)$	13.8

Now,

$$\chi^2 = \frac{(77-13.8)^2}{13.8} + \frac{(150-81.6)^2}{81.6} + \frac{(210-409.2)^2}{409.2} + \frac{(125-81.6)^2}{81.6} + \frac{(38-13.8)^2}{13.8}$$

$$= 289.43 + 57.33 + 96.97 + 23.08 + 42.43 = 509.24$$

$\nu = 4$

$\chi^2_{crit}\big|_{\alpha=0.05} = 9.488$

$\chi^2_{crit}\big|_{\alpha=0.10} = 7.779$

Since $\chi^2 > \chi^2_{crit}$ at both 5% and 10% significance levels, we can reject the null hypothesis that the distribution is normal. $\Rightarrow$ The distribution is not normal

4) For shipment A

mean $= \mu_A = 4.71$,

variance $= s_A^2 = 0.010283$,

for shipment B

mean $= \mu_B = 4.74$

variance $= s_B^2 = 0.005666$

we have, $F = s_A^2 / s_B^2 = 1.815$

$\nu_A = 12$

$\nu_B = 6$

$Q(F|12,6) = 2.9047$ at $\alpha = 0.10$

$\Rightarrow$ we ~~find~~ fail to reject the hypothesis that $s_A^2 = s_B^2$

$$t = \frac{\mu_A - \mu_B}{s_D} \qquad s_D = \sqrt{\frac{s_A^2 N_A + s_B^2 N_B}{N_A + N_B - 2}\left(\frac{1}{N_A} + \frac{1}{N_B}\right)}$$

$s_D = 0.0438$

$t = 0.68493$

for $\nu = 6$ $\quad t_{crit}\big|_{\alpha=0.10} = 1.943$

$\Rightarrow$ we can't reject the hypothesis ~~had~~ that $\mu_A = \mu_B$ at 10% significance level

$\Rightarrow$ shipment A and B are from a distribution whose mean and variance are the same.