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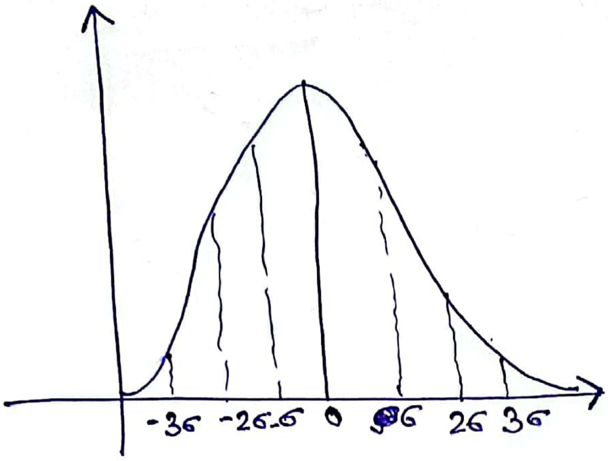

Substracting

$A \in [\mu+2\sigma, \infty)$

$B \in [\mu+\sigma, \mu+2\sigma)$

$C \in [\mu-\sigma, \mu+\sigma)$

$D \in [\mu-2\sigma, \mu-\sigma)$

$F \in (-\infty, \mu-2\sigma)$

Now grade vs number of student.

$A \longrightarrow 2.3 \times 6 = 13.8$

$B \longrightarrow 13.6 \times 6 = 81.6$

$C \longrightarrow 68.2 \times 6 = 409.2$

$D \longrightarrow 13.6 \times 6 = 81.6$

$F \longrightarrow 2.3 \times 6 = 13.8$

Now $\chi^2 = 289.43 + 57.33 + 96.97$
$23.08 + 42.43$
$\simeq 509.24$

$\nu = 4$

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

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

Since $\chi^2 > \chi^2_{cal}$ at both 5% and 10% significant levels, we can reject the null hypothesis that the distribution is normal.

$\longrightarrow$ Distribution is not normal

4) For shipment A

$\mu_A = 4.71$

$S_A^2 = 0.010283$

For shipment B

$\mu_B = 4.74$

$S_B^2 = 0.005666$

Now $F = \dfrac{S_A^2}{S_B^2} = 1.815$

$\nu_A = 12$ $\quad g(F \mid 12, 6) = 2.9047$

$\nu_B = 6$ $\quad$ at $\alpha = 0.10$

$\Rightarrow$ We fail to reject the hypothesis that $S_A^2 = S_B^2$.

$$t = \frac{\mu_A - \mu_B}{S_D}$$

$$S_D = \sqrt{\frac{S_A^2 N_A + S_B^2 N_B}{N_A + N_B - 2}\left(\frac{1}{N_A} + \frac{1}{N_B}\right)}$$

$$S_D = 0.0438$$

$$t = 0.68493$$

For $\nu = 6$ $\quad t_{crit}\Big|_{\alpha = 0.1} = 1.943$

* We can't reject the hypothesis that $\mu_A = \mu_B$ at 10% confidence level.

* Shipment A and B are from a distribution whose mean and variance are the same.