STANDARD NORMAL $Z = \frac{\overline{X} - \mu}{\sigma / \sqrt{n}}$	$f_Z(z) = \frac{1}{\sqrt{2\pi}} e^{-z^2/2}, \quad -\infty < z < \infty$	**SINGLE MEAN** σ known data i.i.d. normal
***t*-DISTRIBUTION** (ν degrees freedom) $T = \frac{\overline{X} - \mu}{S / \sqrt{n}}$	$f_T(t) = \frac{\Gamma\left(\frac{\nu+1}{2}\right)}{\Gamma\left(\frac{\nu}{2}\right)\sqrt{\pi\nu}} \left(1 + \frac{t^2}{\nu}\right)^{-(\nu+1)/2}, \quad -\infty < t < \infty$	**SINGLE MEAN** σ unknown $\nu \equiv n - 1$ data i.i.d. normal
STANDARD NORMAL $Z = \frac{\left(\overline{X}_1 - \overline{X}_2\right) - (\mu_1 - \mu_2)}{\sqrt{\sigma_1^2 / n_1 + \sigma_2^2 / n_2}}$	$f_Z(z) = \frac{1}{\sqrt{2\pi}} e^{-z^2/2}, \quad -\infty < z < \infty$	**TWO MEANS** σ's known data i.i.d. normal
***t*-DISTRIBUTION (APPROX)** (ν degrees freedom) $T' = \frac{\left(\overline{X}_1 - \overline{X}_2\right) - (\mu_1 - \mu_2)}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}}$	$f_T(t) \approx \frac{\Gamma\left(\frac{\nu+1}{2}\right)}{\Gamma\left(\frac{\nu}{2}\right)\sqrt{\pi\nu}} \left(1 + \frac{t^2}{\nu}\right)^{-(\nu+1)/2}, \quad -\infty < t < \infty$	**TWO MEANS** σ's unknown $\nu = \frac{\left(s_1^2 / n_1 + s_2^2 / n_2\right)^2}{\frac{\left(\frac{s_1^2}{n_1}\right)^2}{n_1 - 1} + \frac{\left(\frac{s_2^2}{n_2}\right)^2}{n_2 - 1}}$ data i.i.d. normal, distribution is approx
χ^2-DISTRIBUTION (ν degrees freedom) $X^2 = \frac{(n-1)S^2}{\sigma^2}$	$f_{X^2}(\chi) = \begin{cases} \frac{1}{2^{\nu/2}\Gamma\left(\frac{\nu}{2}\right)} \frac{\chi^{(\nu-1)/2}}{\sqrt{\chi}} e^{-\chi/2}, & \chi > 0 \\ 0 & \chi \le 0 \end{cases}$	**ONE VARIANCE** σ known $\nu \equiv n - 1$ data i.i.d. normal
F-DISTRIBUTION (ν_1, ν_2 degrees freedom) $F = \frac{S_1^2 / \sigma_1^2}{S_2^2 / \sigma_2^2}$	$f_F(f) = \begin{cases} \frac{\Gamma\left(\frac{\nu_1 + \nu_2}{2}\right)\left(\frac{\nu_1}{\nu_2}\right)^{\frac{\nu_1}{2}} f^{\frac{\nu_1}{2}}}{\Gamma\left(\frac{\nu_1}{2}\right)\Gamma\left(\frac{\nu_2}{2}\right)\left(1 + \frac{\nu_1 f}{\nu_2}\right)^{\frac{\nu_1+\nu_2}{2}}}, & f > 0 \\ 0 & f \le 0 \end{cases}$	**TWO VARIANCES** σ's unknown $\nu_1 \equiv n_1 - 1$ $\nu_2 \equiv n_2 - 1$ data i.i.d. normal

REF: [1] Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, and Keying Ye, *Probability and Statistics for Engineers and Scientists,* 8th Ed., Upper Saddle River, NJ: Prentice Hall, 2007.