Suppose we have two independent samples drawn from independent populations. While the sample average values are $\bar{x}_1$ and $\bar{x}_2$, the corresponding population means are μ_1 and μ_2. Also, suppose the null hypothesis is $H_0: \mu_1 - \mu_2 = 0$. In this case, the test statistic is given by $\frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{SD}$, where SD denotes the standard deviation of $\bar{x}_1 - \bar{x}_2$.

Suppose we are given three scenarios:

1. The population standard deviations are σ_1 and σ_2 and known.
2. The population standard deviations are unknown but assumed equal.
3. The population standard deviations are unknown and not assumed equal.

The possible values of SD are

- $\sqrt{s_p^2\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}$ with the pooled variance $s_p^2 = \frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2}$
- $\sqrt{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)}$
- $\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}$

Which of the above SD expressions correspond to Scenarios 1, 2, and 3?

The possible test statistics follow a

- *t* distribution with $n_1 + n_2 - 2$ degrees of freedom
- *z* distribution
- *t* distribution with degrees of freedom given by $min\{n_1 - 1, n_2 - 1\}$

Which of the above test statistics correspond to Scenarios 1, 2, and 3?