Suppose we have two independent samples drawn from independent populations. While the sample average values are and , the corresponding population means are and . Also, suppose the null hypothesis is . In this case, the test statistic is given by where SD denotes the standard deviation of .

Suppose we are given three scenarios:

1. The population standard deviations are and 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

* with the pooled variance

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

The possible test statistics follow a

* *t* distribution with degrees of freedom
* *z* distribution
* *t* distribution with degrees of freedom given by

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