# STAT 240 Homework 3

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**1) Show that a permutation test based on $\bar{X}$ and a permutation test based on $t$ are equivalent when $m = n$**

**2) Construct a hypothetical dataset (with at least 3 data points in treatment and at least 3 in control) for which the $p$-value of a permutation test based on $\bar{X}$ is smaller than the $p$-value of a permutation test based on $t$. Try to make the difference substantial.**

**3) Construct a hypothetical dataset (with at least 3 data points in treatment and at least 3 in control) for which the $p$-value of a permutation test based on $t$ is smaller than the $p$-value of a permutation test based on $\bar{X}$. Try to make the difference substantial.**

**4) Construct a hypothetical dataset (with at least 3 data points in treatment and at least 3 in control) for which the $p$-value of a permutation test based on $\bar{X}$ is smaller than the $p$-value of a standard $t$ test. Try to make the difference substantial.**