**Small-Sample Statistics Activity**

Not having access to engine or chassis dynamometers, a person is trying to figure out if a certain engine modification has made an increase in engine power output. They take their car to a drag strip (with timing light accuracy to 0.001 seconds) and make four (4) runs in the original configuration, and four (4) runs with the modification. The results are as follows:

|  |  |  |
| --- | --- | --- |
| Test Run | 1/4 mile time [sec] - unmodified | 1/4 mile time [sec] - modified |
| 1 | 13.65 | 13.25 |
| 2 | 13.42 | 13.54 |
| 3 | 13.58 | 13.35 |
| 4 | 13.37 | 13.42 |

1. Calculate the sample mean of the ¼ mile times for each set of data.
2. Do you believe the modification is producing more power? Why?
3. Calculate the sample standard deviation. Plot the mean, and plus/minus one standard deviation for both data sets on the same number line.

$$S^{2}=\frac{1}{N-1}\*\sum\_{i=1}^{N}(y\_{i}-\overbar{y})^{2}$$



1. Do you believe the modification is producing more power? Why?
2. How confident are you (percentage) in your data ranges?
3. Identify two reasons why you believe the modification is making more power, and two reasons why you believe it is not.