**Small-Sample Statistics Activity#2**

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 at 95% confidence). Independent of how many runs they make, the data comes out as follows:

|  |  |  |
| --- | --- | --- |
|  | 1/4 mile time [sec] - unmodified | 1/4 mile time [sec] - modified |
| Sample Mean | 13.45 | 13.32 |
| Sample Std. Dev. | 0.0560 | 0.0740 |

1. Assuming there was only 4 runs in each configuration calculate the tolerance of the true mean to a 95% confidence for both the unmodified and modified data. Can you tell if the modification is producing more power? Why/why not?
2. For the provided sample mean and sample standard deviation, calculate how many runs in each configuration would it take to be 95% sure the modification made any difference? (Hint: less than 10, more than 5)
3. Using the ‘difference of means’ method, calculate the difference of the true means using just five data sets in each configuration. Can you tell if the modification is producing more power? Why/why not?