Nancy Liu

μ_1 = the mean consumption of energy in KWH that MRHS uses per month in 09-10.

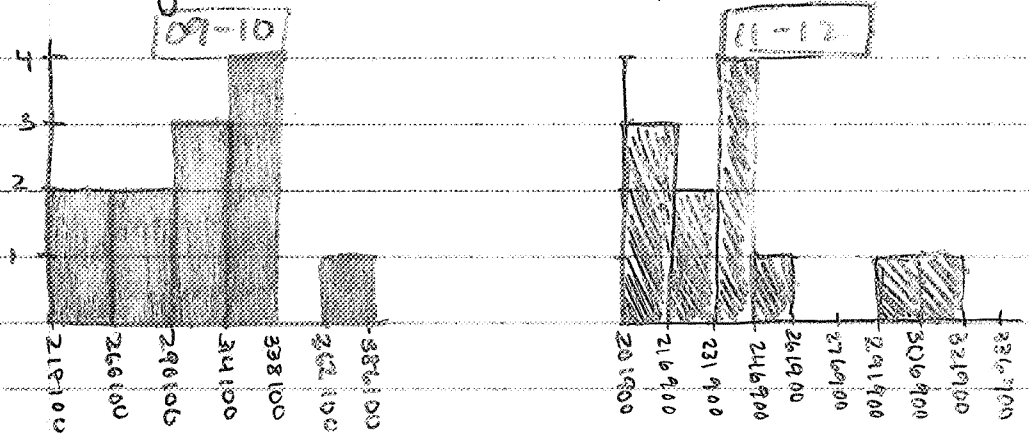
μ_2 = the mean consumption of energy in KWH that MRHS uses per month in 11-12.

$H_0: \mu_1 - \mu_2 = 0$

$H_A: \mu_1 - \mu_2 \neq 0$

Assumptions:

- the sample is representative of all MRHS months
- the groups of data are independent from each other

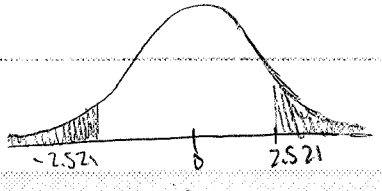


- The two histograms appear unimodal and nearly symmetric. The data does not look very skewed. The sample size is medium.

I will use a 2-sample T-test. $\alpha = 0.05$, $df = 21.829$

$$t = \frac{(\bar{Y}_1 - \bar{Y}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} = \frac{(277225 - 240950) - (0)}{\sqrt{\frac{(36769.6)^2}{12} + \frac{(33647.4)^2}{12}}} \approx 2.521$$

p-value = 0.0195 Reject H_0.



We have enough evidence at the 0.05 level of significance to show that there is a difference between the mean consumption of energy in 09-10 and the mean consumption of energy in 11-12. The probability of error is 0.0195.

μ_1 = the mean consumption of gas in therms that MRHS uses per month in 09-10

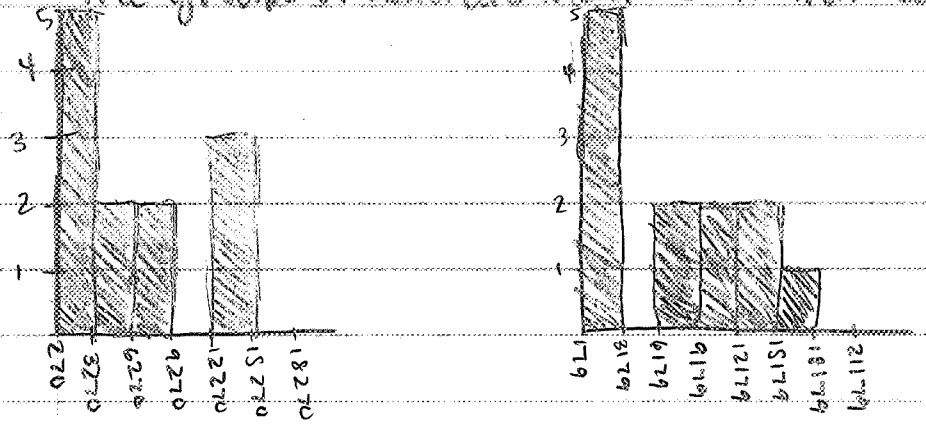
μ_2 = the mean consumption of gas in therms that MRHS uses per month in 11-12.

H_0: $\mu_1 - \mu_2 = 0$

H_a: $\mu_1 - \mu_2 \neq 0$

Assumptions

- the sample is representative
- the groups of data are independent from each other



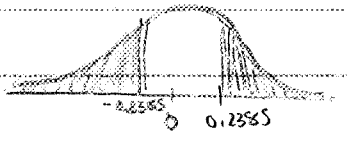
- There is some skewness, but that can be overlooked because the sample size is medium. There are no outliers.

$\alpha = 0.05$

I will use a 2 sample T-test $df = 21.973$

$$t = \frac{(\bar{y}_1 - \bar{y}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} = \frac{(6391.6 - 6976.6) - 0}{\sqrt{\frac{(5901.9)^2}{12} + \frac{(6109.5)^2}{12}}} = 0.2385$$

p-value = 0.814 Fail to reject H_0.



We do not have sufficient evidence at the 0.05 level of significance to show that there is a difference between the mean consumption of gas in 09-10 and the mean consumption of gas in 11-12.

I conclude that the energy saving methods implemented by the Green School committee is helpful in reducing the amount of energy used, but not the amount of gas used. I averaged the amounts of energy used each month in the 09-10 school year to find the mean amount of energy used that school year. Then, I compared that value with the mean amount of energy used in the 11-12 school year. The reason I did not use the 12-13 school year values is because the values of five of the months of the year are missing and the few pieces of data for that school year may not accurately reflect the energy use in that year. I did not use the 10-11 school year average either because one year is a short time period for the energy saving methods to take effect and we want to see the long term effects, not the short term effects. I found the means of the two school years to be different enough that I can safely say that the energy saving methods are working. If there were no difference in the average consumption, a difference this large would only occur 195 times out of 10,000 trials. This is a very small number, so I can say that there is a difference in the energy consumption. I performed the same process with the gas consumption values and found, however, that the average gas consumption did not change very much. In 814 out of 10,000 trials, the averages would be the same. This value is pretty high, so I can say that the energy saving methods do not work on gas consumption.