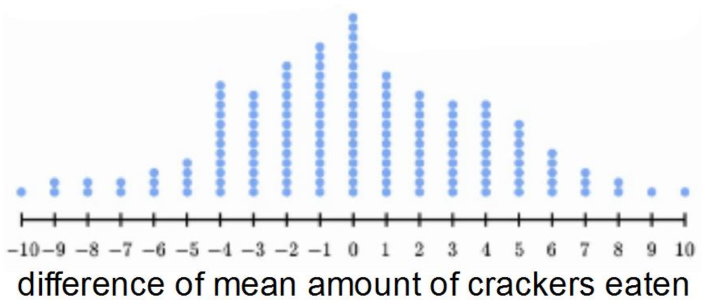
PCFU– Randomization Tests Name ___________________________________

In an experiment aimed at studying the effect of advertising on eating behavior in children, a group of 500 children, 7-11 years old, were randomly assigned to two different groups. After randomization, each child was asked to watch a cartoon in a private room, containing a large bowl of goldfish crackers. The cartoon included two commercial breaks.

The first group watched food commercials (mostly snacks), while the second group watched non-food commercials (games and entertainment products). Once the child finished watching the cartoon, the conductors of the experiment weighed the crackers bowl to measure how many grams of crackers the child ate. They found that the mean amount of crackers eaten by the children who watched food commercials is 10 grams greater than the mean amount of crackers eaten by the children who watched non-food commercials.

Using a simulator, they re-randomized the results into two new groups and measured the difference between the means of the new groups. They repeated this simulation 150 times, and plotted the resulting differences as given below.



1. What is the population difference for the mean amount of crackers?

   The population difference for the mean amount of crackers is ***10 grams****. I know this because it says "they found that the mean amount of crackers eaten by the children who watched food commercials is 10 grams greater than the mean amount of crackers eaten by the children who watched non-food commercials.*

2. If the mean of the randomization distribution is .07 and the standard deviation is 3.8, use the margin of error to find a 95% confidence interval.

   $Margin\ of\ Error = \pm 2\sigma$, Since $\sigma = 3.8$, $Margin\ of\ Error = \pm 7.6$

   Since the confidence interval can be found by $\mu \pm MOE$, and $\mu = .07$, $0.7 - 7.6 = -7.53$ *and* $0.7 + 7.53 = 7.6$.

   Therefore, the ***confidence interval is (-7.53, 7.67)****.*

3. Was the difference in the two treatments statistically significant?

   The difference in the two treatments ***is statistically significant****. I know this because the population difference falls outside of the confidence interval.*

4. What can you conclude from this experiment?

   Since the difference in the two treatments is statistically significant, we can conclude that the children in this study who watched food commercials ate more grams of crackers than the children in this study who watched non-food commercials.

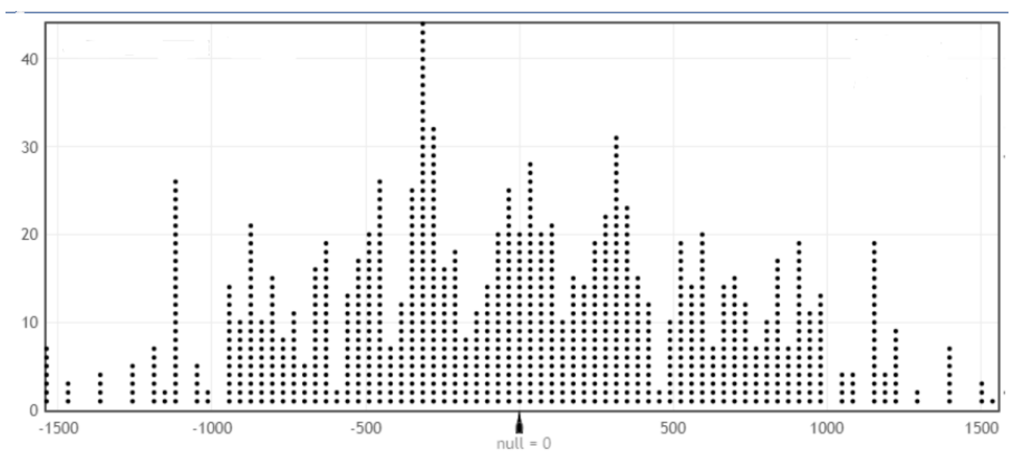
Additional Problems on Back →

1. Listed below are the fair market values (in thousands of dollars) of randomly selected homes on Long Beach Island in New Jersey. A randomization test was used to test a realtor's claim that oceanfront homes (directly on the beach) have a greater value than Oceanside homes, which are not directly on the beach.

Oceanfront	2199	3750	1725	2398	2799
Oceanside	700	1355	795	1575	759

   a. Find the difference of the means.

Using a simulator, they re-randomized the results into two new groups and measured the difference between the means of the new groups. They repeated this simulation 1000 times, and plotted the resulting differences as given below.



   b. If the mean of the randomization distribution is -26.816 and the standard deviation is 641.157, find the 95% confidence interval.

   c. Was the difference in the two treatments statistically significant? **Explain how you know.**

   d. **In context**, what can you conclude from this experiment?