Classroom Activity 6 Math 113 Name : ____________________
10 pts Intro to Applied Stats

Materials Needed:

Scale

Instructions:

Do all work in the metric system

1. M&M/Mars claims that there are ________ grams of candy in each bag.

2. For your bag of candy, measure the following and record.

Mass of package (g)	Mass of wrapper (g)	Mass of candy (g)

3. Record the number of each color M&M in your bag.

Color	Red	Orange	Yellow	Green	Blue	Brown	Total
Number							

4. Gather the amount of candy from all of the students and record them in the table.

5. Record the combined compositions of candy in the tables.

Color	Red	Orange	Yellow	Green	Blue	Brown	Total
Number							

We will be working with the claimed mass of the candy at this point. Save the color data for later in the course.

The original claim is that there is a certain amount of candy in each bag. Since a sample of size one is statistically useless, we'll instead test the claim that the mean of our bags is that amount.

6. Summarize the sample

Sample Size, *n*	Mean, $\bar{y}$	St. Dev, *s*

7. When performing hypothesis testing, there are assumptions that are made. One of these is that the data is randomly selected. Why might this be a concern for our particular sample?

8. Another condition is the normality assumption. That condition is met in one of three ways. Which way is appropriate for our sample?

   a. The mass of candies is nearly normally distributed.
   b. The sample size is large enough, so the central limit theorem applies.
   c. There are more than 10 successes and more than 10 failures.

9. If you answered that the mass of the candies was normally distributed (answer a) to the last question, check the normality.

   a. A histogram of the data (is / is not) unimodal and symmetric?

   b. There (is / is not) a outlier. If there is, we may need to throw it out.

   c. A probability plot (does / does not) fall along the line.

   d. The p-value for the Anderson-Darling normality test (is / is not) below 0.05 (in which case we would reject normality).

   e. The data (does / does not) appear to be normally distributed.

10. Write the original claim symbolically.

11. The original claim is the (null / alternative) hypothesis.

12. Write the null and alternative hypotheses.

    a. H_0 :

    b. H_1 :

13. This is a (left tail / right tail / two tail) test.

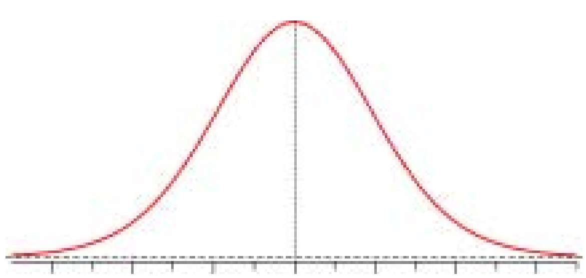
14. The level of significance is α = ________.

15. When testing a claim about a mean, there are two distributions that can be used. In this problem, we'll use the (normal / Student's t) distribution.

16. If you indicated we are using the Student's t distribution, then the degrees of freedom is __________.

17. The critical value(s) is/are _____________.

18. Label the following items on the figure
    a. the critical value(s)
    b. the critical region
    c. the non-critical region
    d. the area in the critical region and the area in the non-critical region
    e. The region where you would Reject H_0 and the region where you would Retain H_0.



19. The formula for the test statistic is $\left(z = \dfrac{\bar{y} - \mu}{\mathrm{SD}(\bar{y})}, t = \dfrac{\bar{y} - \mu}{\mathrm{SE}(\bar{y})} \right)$

20. The test statistic is _____________.

21. The probability value is ______________.

22. The _____ % confidence interval is _________ < μ < _________.

23. The test statistic (does / does not) fall in the critical region, so we (reject / retain) the null hypothesis.

24. The p-value is (less / greater) than the significance level, so we (reject / retain) the null hypothesis.

25. The confidence interval (does / does not) contain the claimed value of the mean, so we (reject / retain) the null hypothesis.

26. The decision is to (reject / retain) the null hypothesis.

27. There (is / is not) evidence at the _____ significance level to (reject / support) the claim that the mean amount of candy in each bag is _________ grams.

28. If you change the alternative hypothesis to be a greater than, the p-value will become ________.

29. There (is / is not) evidence at the _____ significance level to (reject / support) the claim that the mean amount of candy in each bag is more than _______ grams.

30. A one-tail p-value is always (less / more) than a two-tail p-value.

    a. If you reject a two-tail test, you will (never / sometimes / always) reject a one-tail test.

    b. If you reject a one-tail test, you will (never / sometimes / always) reject a two-tail test.