Math 113: Classroom Activity 6 Name : _____
10 pts

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 mass of the 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, $\overline{x}$	St. Dev, s	SE Mean

7. Write the original claim symbolically.

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

9. Write the null and alternative hypotheses.

   a. H_0 :

   b. H_1 :

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

11. The level of significance is $\alpha =$ _____.

12. The Student's t distribution needs degrees of freedom, which are _____.

13. The critical value(s) is/are _____.

14. The test statistic is $t = \dfrac{\overline{x} - \mu}{SE(\overline{x})}$, its value is _____.

15. The probability value is _____.

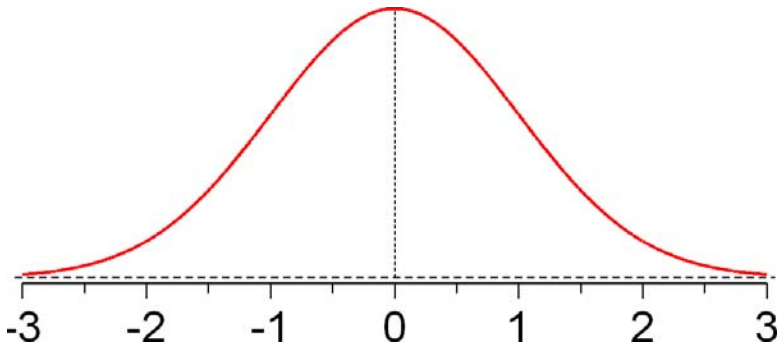
16. The _____ % confidence interval is _____ $< \mu <$ _____.

17. Complete the following table to demonstrate an understanding of the relationship between the answers questions 10-15. Correctly label four of the values in the table as CV, TS, α, and p-value.

t-score	area to left*	area to right*	twice smaller area

*If you have a two tail test, then put the same area for the left and right when finding the critical value.

18. Illustrate the diagram as follows
    a. Draw and label vertical line(s) at the critical value(s)
    b. Shade and label the critical region
    c. Label the non-critical region
    d. Draw arrows and label the area in the critical region and non-critical region. Use α notation like $\alpha = 0.05$ or $1-\alpha = 0.05$.
    e. Label the appropriate regions with "Reject H_0" and "Retain H_0".
    f. Draw and label a vertical line at the test statistic.
    g. Draw an arrow and label the area beyond the test statistic with the p-value.



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

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

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

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

23. There (is / is not) enough evidence to (reject / support) the claim that the mean amount of candy in each bag is _____ grams.

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

25. There (is / is not) enough evidence to (reject / support) the claim that the mean amount of candy in each bag is more than _____ grams.

26. Complete the following table regarding p-values and decisions. Assume the one tail area is the area of the smaller of the two tails.

one tail area	two tail area	one tail decision	two tail decision
0.063		Reject / Retain	Reject / Retain
	0.078	Reject / Retain	Reject / Retain
	0.036	Reject / Retain	Reject / Retain
0.003		Reject / Retain	Reject / Retain

27. Assuming the correct tail is used, a one-tail p-value is always (half / twice) 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.