**Do Skittles or M&Ms have more orange candies?**



Mr. Wilcox believes that Skittles have a higher proportion of orange candies than M&Ms, while Mrs. Gallas believes the opposite. Who is correct?

1. Take an SRS of 50 Skittles and an SRS of 50 M&Ms. Calculate the proportion of orange candies in each sample and find the difference between proportions (Skittles – M&Ms).

Skittles:\_\_\_\_\_\_\_ M&Ms:\_\_\_\_\_\_\_ Difference (Skittles – M&Ms):\_\_\_\_\_\_\_

1. Write the difference on a sticker dot and place on the dot plot at the board. Copy the class dot plot below.



 Difference between proportions (Skittles – M&Ms)

1. What does each dot represent?
2. For the dotplot above, make a prediction about the following:

Shape:

Center (mean):

Variability (SD):

A Google search reveals that 21.6% of Skittles are orange and 20% of M&Ms are orange.

1. Describe the sampling distribution of the sample proportion of orange for Skittles (*X*) and the sampling distribution of the sample proportion of orange for M&Ms (*Y*) for samples of size 50.

|  |  |  |
| --- | --- | --- |
|  | Skittles (*X*)  | M&Ms (*Y*) |
| Shape: |  |  |
| Mean: |  |  |
| SD: |  |  |

1. Describe the sampling distribution of the difference between proportions of orange Skittles and M&Ms (*X – Y*).

Shape:

Mean of difference between proportions:

Standard deviation of the difference between proportions:



1. Mr. Wilcox and Mrs. Gallas calculated a difference between proportions of 0.08 from their samples. Calculate the probability of getting this difference in proportions or higher.

The Sampling Distribution of $\hat{p}\_{1}-\hat{p}\_{2}$

Important ideas:

Check Your Understanding

At Westville High School there are 315 seniors and 389 juniors. 65% of the seniors have parking passes and 42% of the juniors have parking passes. The statistics teacher selects a SRS of 30 seniors and a separate SRS of 30 juniors. Let $\hat{p}\_{S}-\hat{p}\_{J}$ be the difference in the sample proportions of seniors and juniors that have parking passes.

1. What is the shape of the sampling distribution of $\hat{p}\_{S}-\hat{p}\_{J}$? Why?
2. Find the mean of the sampling distribution.
3. Calculate and interpret the standard deviation of the sampling distribution.
4. What is the probability that the difference in sample proportions (senior – junior) of students with parking passes is greater than 30%?