

Starburst Standard Normal Distributions Mini Project

🦋 **Objective:** You will be able to determine if the flavors of Starbursts are normally distributed and use this data to support an argument as to whether or not more effort is required in making sure that the number of each flavor of Starbursts per bag is appropriate.



Let's Hypothesize! [5 points]

How many different flavors does your package of Starbursts contain?

What percentage of the package would you expect to be strawberry (pink)? Explain.

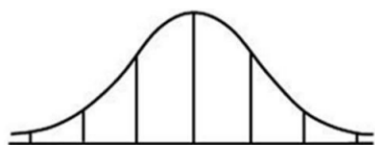


Would you be concerned if a higher (or lower) percentage of the Starburst in your package were strawberry flavored? What you feel as though the packaging is misleading if you purchased a package of Starburst in which there was a higher (or lower) percentage of pink Starburst? Why?

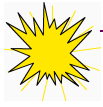


Assume and Analyze a Normal Distribution! [10 points]

We know the ratio of pink starburst to total starburst per package varies. Suppose this ratio is normally distributed with $\mu = 0.25$ and $\sigma = .09$. Sketch this distribution below. Be sure to include three standard deviations above and below the mean.



Based on your sketch of the normal distribution, describe an interval of how many pink Starbursts you expect to have in your package now. Support your reasoning. Also describe any situations in which you would feel “mislead” by the packaging.



Take Your Sample! [10 points]

Open your package of Starbursts. Record the total number of Starbursts, and the number of each flavor of Starbursts.

Total	Pink	Red	Orange	Yellow

Calculate the sample proportion of pink Starbursts for your package.

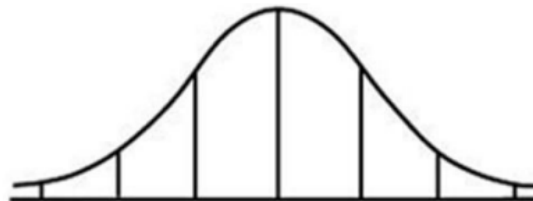
Calculate the z-score in order to determine how many standard deviations above or below the mean this sample proportion falls.



Make Some Inferences! [12 points]

We can actually use this z-score to figure out what percentage of Starburst packages of the same size should have a pink:total ratio lower or higher than yours!

Label the normal distribution curve below, and include an indication for your sample proportion.



Use red to shade the area under the curve that represents the percentage of packages of the same size that you would expect to have a lower pink:total ratio than your package.

Use green to shade the area under the curve that represents the percentage of packages of the same size that you would expect to have a higher pink:total ratio than your package.

Based on this observation, we would expect approximately _____ of Starburst packages of the same size to have a lower pink:total ratio than your package, and approximately _____ of Starburst packages of the same size to have a higher pink:total ratio than your package.

***Come to a Conclusion and Make a Decision!*** [13 points]

Now let's record the data for each Starburst package in this classroom!

Total	Pink	Red	Orange	Yellow

Do the results from this sample survey follow the standard normal distribution you observed?
Explain your answer thoroughly.

Would you argue that the company should put more thought or effort into how many of each flavor of Starburst are placed into each package of the size we worked with in class? Explain.

How do you think the results of this activity would have differed if each group were given a 54 ounce package of Starburst?



Bonus! [+2.5 points]

Choose any other Starburst flavor. Compare and contrast, in detail, how the results of this activity would have been if we had used that flavor as a basis. Be sure to show and explain calculations to support your claims.