3.2 UNDERSTANDING R^2 - GRABBING STARBURSTS

CREATING A MODEL

Mr. Tyson is rewarding his students with a "candy grab." If a student earns a reward, Mr. Tyson will allow that student to reach in to a bowl and grab as many Starbursts as they can hold in their hand. Your job is to help Mr. Tyson predict how many Starbursts he can expect a student to grab. Students must grab "overhand" (like a claw) and may not use the side of the bowl, their other hand, or their body to assist in the grab.

1. Take a guess at the number of Starburst candies that you could hold in your dominant hand.

2. Using the bowl of Starbursts provided by Mr. Tyson, grab as many candies as you can with your dominant hand. Don't use your other hand or your body to assist you. Record the number of starbursts you grabbed below.

3. Mr. Tyson will combine your results with the rest of your class in a Fathom document.

4. Mr. Tyson would like to predict how many Starbursts a student would grab, but he doesn't know which student it will be, since he doesn't know who will earn the reward. How could you use the data you have to predict the number of Starbursts a student would grab?

5. The model you have created serves as a basic reference point for other models. If we have no other information, the best prediction for the number of Starbursts that a student will grab is _____.

6. Does this model predict correctly for every student? In other words, is there prediction error using this model? Find the sum of the squared errors using technology (call it SST).

7. How could you adjust your model to make better predictions? Suppose Mr. Tyson allowed you to collect data on another variable that could help you make a better prediction for the number of Starbursts a student can grab. Suggest a variable that you think would be reasonable for this purpose.

CREATING A BETTER MODEL

8. Go ahead and collect data for this variable. Mr. Tyson will add it to the data you have already collected in the Fathom document.

9. Use technology to build a regression model for predicting the number of Starbursts grabbed. Does this model seem to do a better, worse, or about the same job of predicting the number of Starbursts?

10. Using technology, find the sum of the squared errors that remain, even after making predictions with the regression model (call it SSE).

11. How much (squared) error have we eliminated by using the regression model, compared to the mean model? Compute the difference in the sums of squares between your two models.

    SST – SSE =

12. Now, find the percentage of error eliminated by the regression model compared to the mean model.

    (SST – SSE)/(SST) =

13. What symbol has this value in the regression output from Fathom?

14. Provide a single sentence interpretation for r^2.