**UFC Normal Distribution Solutions**

The UFC officially began in 1993 and has been growing in popularity ever since. As of 2023, it’s the largest mixed martial arts promotion in the world. The UFC represents fighters from over 75 different countries and there have been over 700 events around the world. The UFC attracts a diverse group of spectators from all different backgrounds that support their nation’s top fighters.

We will be investigating striking accuracy percentages from fighters who competed from 1993 to 2021. The data we will be using contains 1673 rows and 14 variables, each row representing a fighter and their career statistics.

In the UFC, striking is hand-to-hand combat in the standing position. A landed shot is when a fighter hits their opponent’s body without being blocked. The accuracy percentage is defined by the number of lands divided by the number of attempts. Being an accurate striker is an important skill as it can help you conserve energy, land more shots, and weaken the opponent.

Our goal is to find what striking percentages will place you in the bottom, middle, or top of the pack in the approximately normal distributed percentages. Although not a make-or-break skill in a fight, having a higher percentage can greatly improve the chances of winning.

According to UFC fighter data the mean striking accuracy percent is 43.2 with standard deviation 12.6.

1. Explain why a normal distribution seems like a reasonable way to describe these data.

Since the distribution is unimodal and approximately symmetric, a Normal distribution (with mean 43.2 and standard deviation 12.6) seems very appropriate here.

1. The UFC fight of the year in 2019 was between Israel Adesanya and Kelvin Gastelum. Adesanya (the winner) had a striking accuracy percentage of 49%. What proportion of fighters had a better striking accuracy percentage than him?

0.323

1. Kelvin Gastelum had a striking accuracy percentage of 43%. What proportion of fighters are in between him and Adesanya?

0.355

1. Find the z-score of Israel Adesanya’s striking accuracy percentage (49%).

z-score = = = 0.46

1. What would a high and low z-score mean in the context of striking accuracies in the UFC? Explain.

A high z-score would mean the fighter has a higher striking accuracy percentage than the average UFC fighter, while a low z-score would mean the fighter has a lower accuracy percentage than the average fighter.

1. Fighters with the top 10% for accuracy percentage have above what accuracy percentage?

59.347

1. What accuracy percentages cut off the middle 80% of the distribution?

27.053 and 59.347

1. Brainstorm some ideas on different types of statistical applications you could use with this data with since it’s approximately normal. Explain.

Sample ideas for just this variable: Hypothesis tests, confidence intervals

Can easily extend results to utilize additional varaibles.

1. Which other variables in the data set seem like they could be described using a normal distribution? Explain

Recommendation: Split students into group and have each investigate only a subset of the other variables. We assume students will likely graphically explore the other variables. For the instructor’s convenience, here are Normal Probability Plots for each of the numerical variables.

Reach and height are, not surprisingly, normally distributed. Str\_Acc (Striking Accuracy) and Str\_Def (Striking Defense) both look approximately normal. TD\_Acc and TD\_Def are interesting in that the interior looks normal, but because they are bounded by 0 and 100, make Normal models unsuitable for them.

These other variables can lead to an interesting statistics conversation related to “how approximate is too approximate” for applying normal models.

