

Average Athletics

Working with the Meaning of Mean (Average)

“When am I ever going to use this?”
Using the concepts in this worksheet, you will be able to interpret what the idea of average means in the context of athletics.

OA frequently misunderstood mathematical concept is the notion of the mean (average). In this worksheet we will investigate the idea of the mean (average) in different contextual situations dealing with athletes and athletics.

1. Geography majors who graduated from the University of North Carolina (UNC) reported an average salary far higher than geography graduates at other universities. The average salary at the time of the report was over \$400,000 per year. (Source: www.unc.edu) From the options below select the one you believe to be the most likely reason for this occurring.
 - a. UNC has a superior geography faculty
 - b. UNC attracts superior geography students
 - c. UNC is the university that Michael Jordan (Former Chicago Bulls NBA star) graduated from as a Geography major
 - d. UNC geography students do not tell the truth about their starting salary on surveys

Option c is most likely.

2. Explain using a numerical example why you chose the option you did in problem 1.

An NBA star will most likely make a much larger salary than the other graduates majoring in geography and thereby “pulling” the average salary significantly higher than it would normally be. If we hypothetically say that Jordan made \$2,750,000 in a particular year and 6 other UNC graduates made \$50,000, \$37,000, \$42,000, \$39,500, \$51,300, and \$29,900 then the average salary of these 7 would

be \$422,528.57 since $\frac{2999700}{7} \approx 428,528.57$

Without Jordan’s salary the average salary for the remaining 6 would have only been \$41,616.67

since $\frac{249700}{6} \approx 41,616.67$

Jordan’s single very large salary raises the average salary for all 7 by over 10 times as much.

3. Why would a single outlier (data value far from the others) affect the average salary so much?

To calculate the average we find the total salary and then equally distribute it to each person. When one salary is so much greater or less than the others there is a big variation that must be equalized.

4. In NASCAR, Jeff Gordon once won the Pennsylvania 500 race in 3.713 hours. Calculate his average speed for the 500 miles of the race. (Source: www.espn.com)

$$\frac{500}{3.713} \approx 134.66 \text{ Gordon's average speed was } 134.66 \text{ miles per hour.}$$

5. If Gordon was traveling at 218 miles per hour at one point in time during the Pennsylvania 500 race, how is this possible considering your answer to problem 4?

The mean (average) speed is how fast Gordon would have been going if he had traveled the same speed the entire race. Therefore, in reality, he would have traveled faster and slower than the average speed of 134.66 during the duration of the race.

In baseball, the batting average (BA) of a player is an important statistic that is used by teams to determine how successful their players have been at the plate. The BA is calculated by taking the total number of hits divided by their official at bats (do not include walks or plate appearances where a player is hit by a pitch or performed a sacrifice).

6. In 2011 in the National League two players were competing to become the batting average champion. It came down to the last game of the season between José Reyes of the New York Mets and Ryan Braun of the Milwaukee Brewers. Jose Reyes ended the season with a BA of 0.337 and Braun with 0.332. Interpret what each of the batting averages mean in terms of hits and at bats. (Source: www.espn.com)

Jose Reyes' 0.337 BA means that for 1000 official at bats he is expected to get 337 hits if he were to get the same number of hits every 1000 official at bats. Likewise, Ryan Braun would get 332 hits in 1000 official at bats if he gets the same number of hits every 1000 official at bats.

Another important statistic in baseball is a pitcher's ERA (earned run average). ERA is calculated by taking the number of earned runs a pitcher has (ER) times 9 innings and then dividing by the number of innings pitched (IP) or $(ERA = \frac{9(ER)}{IP})$.

7. Clayton Kershaw of the Los Angeles Dodgers had the lowest ERA for 2011. Calculate his ERA considering he had 59 earned runs and pitched 233.3 innings. (Source: www.espn.com)

$$9 \cdot \frac{59}{233.3} \approx 2.28$$

8. Explain what Kershaw's ERA means in terms of pitching.

The ERA of 2.28 means that if every nine inning game were pitched the same Kershaw would give up a little over 2 runs per game.