

The student is working on the following problem:

Table 1. shows the number of goals that each football player striker scored between 2007 and 2011. Who is the most consistent player? Imagine a measure of "consistency" and justify why you think your method is correct.

Year	Mike Arwen	Dave Backhand	Ivan Right
2007	13	12	14
2008	12	14	10
2009	15	16	18
2010	17	15	18
2011	13	13	15

The solution of this problem is:

The concept of standard deviation is the usual way to measure consistency but it is not expected that the student knows it. Any measure proposed by the student to measure consistency is acceptable as long as it can be justified.

Example of canonical solution: computing the variance (or standard deviation) for each player: First, compute the mean:

Mean number of goals for Mike: 14

Mean number of goals for Dave: 14

Mean number of goals for Ivan: 15

Then, compute the sum of square deviations from the mean for each player.

Then divide by the number of data points to get the variance:

Variance for Mike:  $12/5 = 3.2$

Variance for Dave:  $10/5 = 2$

Variance for Ivan:  $44/5 = 8.8$

So according to the variance, Dave is the most consistent player.



Hello! I am your tutor. Can you walk me through your solution?

hey! so i'm kinda stuck. i've never really done something like this before. how do I even start with measuring consistency?





What do you understand by the term "consistency" in the context of a player scoring goals over a period of time?

well if a player is consistent, i guess it means they score around the same number of goals each year, like not too many ups and downs. so we prob need a way to show how much the goals change each year for each player right?



Exactly, you're on the right track. Now, given that idea, how might you represent these changes numerically using the data you have?

i could like take the average number of goals they scored first? and maybe then see how much each year's goals are different from the average? but not sure how to put it all together...



You've got a good starting point with calculating the average. What would be your next step after finding the average for each player?

after i get the average for each player, i think i should look at each year and see how far the goals are from the average? like if mike scored 13 goals and his average is 14 then it's like 1 goal off? but do i just add up how far off each year is?



That's a reasonable approach you're suggesting. Why do you think you would add up how far off each year is? What could that tell you?

if we add up how far off each year's goals are from the average we could see the total difference over the 5 years. But if a player scored way over one year and way under the next, it could kinda cancel out. So maybe we need to make sure all the differences count as if they're far from the average no matter if it's under or over. So like, take the absolute value or square them or something? But still not sure how that all adds up to consistency.



What effect would squaring the differences have as opposed to taking the absolute values? How could this influence your measure of consistency?

oh if we square the differences, it'll make bigger gaps count more since the square of a big number is a lot bigger. and it'll also deal with the positives and negatives cuz a negative number squared is positive. that could work for consistency cuz more consistent players should have smaller differences from their average so smaller numbers when squared. and less consistent players with bigger differences will have big numbers when squared. so maybe that can be a measure?



You're engaging with the problem quite well, and it's great to see you thinking critically about different methods. Keep exploring these ideas, and you'll be able to construct a solid measure of consistency. Good luck with your analysis! If you have any more questions in the future, feel free to reach out. Goodbye!

Thanks for the help! I'll work on squaring the differences and see what I can come up with. Might hit you up later if I get stuck again. Goodbye!



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