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Welcome to this complete step-by-step guide to central tendency and how to find the mean, median, and mode of a data set. This post will share key information, formulas, and vocabulary so that you can use math to determine the mean, median, mode, and range of any data set and understand what these values represent. After working through two examples, you will also have access to a free mean, median, and mode pdf practice worksheet that includes an answer key. Now lets go ahead and begin this lesson by raising two key questions:For a given set of data What does the mean, median, mode, and range represent?How can you find the mean, median, mode, and range of a data set?What is Central Tendency?Mean, median, and mode are measures of central tendency and are three different ways of expressing averages of a set of data.The key term here is average. In math, central tendency is a number or value that can be used to describe a central position, or average value, within a data set.Furthermore, the range of a set of data is the difference between the highest and lowest values. With this key math vocabulary in mind, lets take a look at two examplesExample 01: Find the Mean, Median Mode, and RangeFind the mean, median, mode and range of the data set: 1, 6, 7, 4, 6, 8, 3 *Before you find the mean, median, mode, and range of a data set, be sure to rewrite the list of values in either ascending (least to greatest) or descending (greatest to least) form.For todays examples, we will be rearranging the original data set into ascending form where the values are placed in order from least to greatest as follows: Now that we have rearranged the values of the data set in ascending order, we are ready to find values of central tendency.Step 01: Find the MeanThe mean is the numerical average of a data set.To determine the mean of the data set, divide the total sum by the total amount of numbers.In this example, to find the total sum, add all seven values in the data set together as follows:1 + 3 + 4 + 6 + 6 + 7 + 8 = 35The total sum is 35.Next, divide the total sum by the total amount of numbers in the data set (which, in this example is 7).35/7 =5 >>> The mean is 5 goals per game. For future reference, here is a handy formula that you can always use to find the mean of a data set. To determine the mean, simply divide the total sum of all of the values in the data set by the total number of values as follows: The median is the middle number or value of a data set.To determine the median of numbers in the data set, simply find the middle value.In this example, notice that there is an odd number of values in the data set (7 total). To find the median of numbers, start crossing the bookend values on each side of the data set as you make your way towards the middle until only one value remains as follows Clearly, the middle value is 6, so you can conclude that the median of the data set is equal to 6. *Note that when there is an even number of values in the data set, using this strategy to find the median will require one extra step (we will go more in depth in example 2).Median CalculatorLooking for a quick way to central tendency values? This median calculator (which is really a mean, median, mode calculator from Calculator Soup) is an excellent tool for quickly finding these values. However, this website should only be used a tool for checking your work and not a substitute for understanding how to actually find the mean, median, mode, and range of a data set.Step 03: Find the ModeThe mode of a data set is the most common number. It is possible to have more than one mode, or no mode at all.If youre looking for a simple answer to how to find the mode of a data set, then youre in the right place. To find the mode, simply look for the value that occurs the most often (i.e. the value that repeats more than any other value).In this example, notice that the only value that repeats is 6 Therefore, you can conclude that the mode for this data set is 6. Just like in example 01, you can find the mode of a data set by determining which value is the most common. You can find this value by looking for numbers that repeat.And remember that it is possible to have more than one mode or no mode at all!Step 04: Find the RangeThe range is the difference between the highest and lowest values in the data set (the largest number minus the smallest number).To calculate range math, simply determine the largest and smallest values and then find the difference by subtracting (rearranging the numbers in ascending order at the very start of this example males calculating the range very easy).In this example, the largest number in the data set is 8 and the smallest number in the data set is 1.To find the range, simply perform 8 1 = 7Therefore, the range is 7 goals. Quick Summary:And now we have found all values of central tendency for this example. Here is a quick summary of what you just did!Keep in mind that the process for determining mean, median, mode, and range of any data set is pretty much always the same. So, now lets try a second example that involves a larger data set! Find the mean, median, mode and range of the data set: 15, 9, 16, 9, 20, 14, 10, 9, 10, 9 Again, just like in Example 01, start by rearranging the numbers in the data set so that they are in ascending order from left to right *Note that the values in the data set have not changed. All that you did was rewrite them in order from least to greatest, which will make finding the mean, median, mode, and range much easier for you (with or without a calculator).Now you are ready to find the mean, median, mode, and range of this data set.Step 01: Determine the MeanTo find the mean of the data set, remember to apply the mean formula, where you find the total sum of all of the numbers and divide it by the total number of values in the data set. In this case9 + 9 + 9 + 10 + 10 + 14 +15 + 16 + 19 + 20 = 131 (the total sum)and there are 10 total numbers.131/10 =13.1 >>> The mean is 13.1 hours studying*Note that it will often be the case that the mean value is decimal. Remember that the median represents the middle value of a data set.To determine the median of numbers in the data set, you perform the same process of crossing out the bookend values on the left and right of the data set until you reach the middle. Unlike the last example where the data set had an odd number of values, this data set has an even number of values (ten in total), which means that there will one be extra step involved to find the median. After crossing out the outside values and working your way to the middle, you will notice that, because the data set has an even number of values, there are two values in the middle (in this case, 10 and 14).So, which value is the median? In cases like this, the median is the average of the two values. To find the average, simply add the two values together and divide the sum by two as follows:10+ 14 = 24 >>> 24/2 =12 The median of the data set is 12 hours. Remember that the mode of any data set is the most common number and that the key to finding the mode is to look for repeat values. Notice that this data set has two values that occur more than once: 9 and 10. In this case, 9 shows up three times and 10 shows up twice. Since 9 shows up more often than 10, you can conclude that 9 is the most common number in the data set and that the mode is 9. The last remaining measure of central tendency that you must find is the range, which is the difference between the largest number and the smallest number.To calculate range for this example, look at the data set and identify the largest value (20) and the smallest value (9) and then find the difference as follows20 -9 = 11 >>> The range of the data set is 11. By Anthony PersicoAnthony is the content crafter and head educator for YouTube'sMashUp Math. You can often find me happily developing animated math lessons to share on my YouTube channel. Or spending way too much time at the gym or playing on my phone. 1 Comment The discipline concerning the compilation, organization, study, interpretation, and presentation of data is statistics. It is traditional to start with a statistical population or a statistical model to be studied when applying statistics to a scientific, industrial, or social problem. It also helps us to explain many observations from it and foresee many possibilities for additional applications. We may find various measurements of central tendencies and the divergence of different values from the centre using statistics.What Are the Various Statistics Formulas?The Main Concepts in Statistics AreMeanMedianModeStandard deviationVarianceLet Us Understand the Above 5 Statistics Formulas With Examples :Mean: The arithmetical mean is the sum of a set of numbers separated by the number of numbers in the collection, or simply the mean or the average.Median: In a sorted, ascending or descending, list of numbers, the median is the middle number and may be more representative of that data set than the average.(Image to be added soon)Mode: The mode is the value that most frequently appears in a data value set.(Image to be added soon)Standard Deviation: A calculation of the amount of variance or dispersion of a set of values is the standard deviation.(Image to be added soon)Variance: The expectation of the square deviation of a random variable from its mean is variance.Now let us look at the formula of statistics that can be used while solving the problems.Basic Statistics FormulasTo solve statistical problems, there are few formulas of statistics that will be used the most, they are as follows :Mean: To calculate the mean of a given data set, we use the following formula,Mean (\[\bar{x}\]) = \[\frac{\sum x}{N}\]Median: In the case of the median, we have two different formulas. If we have an odd number of terms in the data set we use the following formula,Median = \[(\frac{n+1}{2})^{th}\] observation If an even number of terms are given in the data set, we use the following formula,Median = \[\frac{(\frac{n}{2})^{th} \; observation + (\frac{n}{2}+1)^{th} \; observation}{2}\]Mode: In the case of clustered frequency distributions, it is not possible to calculate the mode simply by looking at the frequency. We measure the modal class in order to evaluate the data mode in such situations. Inside the modal class, the mode lies.Mode = \[l + (\frac{f_{1}-f_{0}}{2f_{1}-f_{0}-f_{2}}) \times h\]Standard Deviation: By evaluating the deviation of each data point relative to the mean, the standard deviation is calculated as the square root of variance.Standard deviation() = \[\sqrt{\frac{\sum (x_{i}-\mu)^{2}}{N}}\]Variance: The variance is defined as the total of the square distances from the mean () of each term in the distribution, divided by the number of distribution terms (N).Variance(2) = \[\frac{\sum (x_{i}-\mu)^{2}}{N}\]These are a few formulas for statistics that are to be used while attempting any statistics problems.ConclusionIn statistics, the aim is to gather and analyze vast amounts of numerical data, in particular for the purpose of deducting the proportions in total from those in the representative sample. In statistics, all formulas are given in data sets on which the analysis is done.In statistics and data analysis, the mean, median, mode, range, and standard deviation tell researchers how the data is distributed. Each of the five measures can be calculated with simple arithmetic. The mean and median indicate the "center" of the data points. The mode is the value or values that occur most frequently. Range is the span between the smallest value and largest value. Standard deviation measures how far the data "deviates" from the center, on average. Knowing how to calculate these statistical measures will help you analyze data from surveys and experiments.MeanThe arithmetic mean or average of a set of numbers is the expected value. The mean is calculated by adding up all the values, and then dividing that sum by the number of values.For example, suppose a teacher has seven students and records the following seven test scores for her class: 98, 96, 96, 84, 80, 80, and 72. The average test score is(98+96+96+84+81+81+73)/7 = 609/7 = 87.If one more student entered her class and took the test, the expected score would be an 87.The median is the middle value in a set of values. To find the median, order the numbers from largest to smallest, and then choose the value in the middle. For example, consider the following set of nine numbers:10, 13, 4, 25, 8, 12, 9, 19, 18If we arrange them in descending order, we get25, 19, 18, 13, 12, 10, 9, 8, 4The middle value is 12, so the median = 12. What if we have a set with an even number of values? For example, consider the set1, 2, 3, 4, 5, 6.Both 3 and 4 are in the middle. In this case, we must take the average of the two middle numbers. Since (3+4)/2 = 3.5, the median = 3.5.The mode of a set is the value or values that occur most frequently. There can be more than one mode in a set. If there is more than one mode, you simply list all of the modes; you do not have to average them. For example, consider the set10, 10, 4, 8, 10, 8, 3, 9, 14The number 10 occurs three times, and no other numbers occur as frequently. Therefore, the mode = 10Now consider this set10, 10, 4, 8, 10, 8, 3, 8, 14Both 10 and 8 occur three times each, and no other numbers occur as often. Therefore, the modes are 8 and 10.The range of a set of numbers is the maximum distance between any two values. In other words, it's the difference between the largest and smallest values. Knowing the range gives you an idea of how close together the data points are. For example, consider the set of test scores78, 88, 67, 90, 92, 83, 97The highest test score is 97 and the lowest is 67, therefore the range is 97-67 = 30.The standard deviation is another way to measure how close together the elements are in a set of data. The s.d. is the average distance between each data point and the mean. Knowing the standard deviation gives a more complete picture of the distribution of elements in a data set. Suppose you have N data points and you label them X1, X2, X3,... XN, and you call the mean . There are two formulas for standard deviation depending on whether your data is a complete set, or a sample take from a larger set.For example, suppose your data is all of the ACT scores of the students in a small class. Then the standard deviation formula isSuppose the scores are 15, 21, 21, 21, 25, 30, and 35. The mean of this set is 24. The s.d. issqrt[((15-24)2+(21-24)2+(21-24)2+(21-24)2+(25-24)2+(30-24)2+(35-24)2)/7]= sqrt[266/7]= sqrt[38]= 6.16If you take a random sample of ACT scores from a large school, the standard deviation formula isFor example, suppose you select ten students at random from a high school, and their ACT scores are 17, 20, 24, 25, 26, 26, 29, 29, 30 and 32. The average of this set is 25.8. The standard deviation issqrt[((17-25.8)2+(20-25.8)2+(24-25.8)2+(25-25.82+(26-25.8)2+(26-25.8)2+(29-25.9)2+(29-25.8)2+(30-25.8)2+(32-25.8)2)/(10-1)]= sqrt[(191.6 )/(10-1)]= sqrt[191.6/9]= sqrt[21.2889]= 4.61 Had2Know 20101Purchase a good graphing calculator. Before your class begins, purchase a good quality graphing calculator and read the instruction manual so youre ready to use it when the class begins. While your teacher will likely insist that you learn how to do some things by hand in your statistics class, youll need to use a graphing calculator for much of the work in the class.[1]If youre taking an AP Statistics class, youll likely need to use a TI-83 or TI-89 graphing calculator to pass the course.[2] 2Learn the foundational statistics skills and concepts. In order to keep up in your statistics class, its important that you make sure that you understand the foundational skills and concepts. While there are several, arguably the most important basic concepts that provide the foundation for all other statistical concepts are mean, median, variance, and standard deviation.[3]The mean is the average of a set of numbers.The median is the middle number of a set of numbers.The variance is the average of squared differences from the mean.The standard deviation is how much each data point differs from the mean.3Read over the material for the next class ahead of time. Reading over the material ahead of time is a great way to help you get familiar with the concepts youll be learning so youll be able to pay attention and take notes without falling behind. Doing so will also give you an idea about what questions you may have so you can come to class knowing what concepts youll need a bit more help with.[4]4Avoid skipping any classes so you dont miss important concepts. Unlike some subjects, statistics concepts generally build on one another. Therefore, in many cases, youll need to learn and understand one concept before youre able to understand the next. As a result, its important that you attend all your classes so that you dont miss learning a foundational concept that could impact your ability to understand future concepts.[5]While its important that you always attend your statistics class so you dont fall behind, its particularly important that you attend all the classes in the first month or so, as this is the time that your teacher will be explaining the basic foundational concepts.[6]For example, in order to calculate P-value, you have to run a hypothesis test to get a test statistic, such as an F statistic. But, in order to run a hypothesis test, you need to know how to state the null hypothesis. If you dont know how to state the null hypothesis, a basic statistics concept, you wont be able to find the P-value.[7]5Take notes on all the material presented in class. Taking consistent notes in your statistics class will not only help you review the material and study later on, it will also help you remember better just by writing it down.[8] Even if you review the material ahead of class and feel like you have a good grasp on it, taking notes will help solidify the knowledge in your mind so youll be able to recall what you need to know quickly.[9]6Do all your homework so you stay on track. Paying attention and learning about statistics concepts in class is important, but actually doing statistics problems on your own is crucial if youre going to pass the class. Therefore, staying on top of your homework is one of the best ways to ensure that you really learn the important concepts so you can pass the class.[10]In most statistics classes, your homework will be part of your grade. Therefore, in addition to helping you better understand the concepts, doing your homework will help you boost your grade and pass the class.[11] 1Review the key statistical concepts and procedures before each test. When studying for statistics tests, one of the most helpful things you can do is to review the relevant foundational concepts that youve learned in the past. Even if you feel like these concepts are easy for you to understand at this point, it will be helpful for you to take a bit of time to make sure you fully understand them.[12]A few important foundational statistics concepts that can be helpful for you to review before any test include mean, median, standard deviation, populations and parameters, hypothesis testing procedures, and chi-square analysis.[13]2Do extra practice exercises before taking your statistics tests. To help you prepare for a statistics test, check your statistics textbook or ask your teacher to provide you with some extra problems that focus on some of the concepts youve struggled with in class. Doing some extra practice questions will help you actively learn the material and put your knowledge into practice.[14]3Study the concepts rather than trying to memorize formulas. While memorizing some formulas is helpful, in most cases, youll be able to solve statistics problems if you understand the foundational concepts. Therefore, when youre studying for a test, focus on understanding concepts first. Then, you can go back and memorize any formulas that you know youll need to memorize to pass the test.[15]To help you understanding and remember statistics concepts, look for reoccurring themes or similarities across concepts.For example, if you know that the standard deviation tells you how much each point of data differs from the mean, youll know that you need to find the mean of the numbers first. Therefore, by understanding the concepts, youve already taken the first step towards finding the answer.4Break the material down into smaller sections. Learning statistics can take time, and seeing a complex problem can feel overwhelming. Instead of trying to learn all the material at once, break it down into a step by step process. You may need to invest more time, but itll be worth it in the end.[16]For example, if you need to find the standard deviation, break this down into 3 basic steps: finding the mean, finding the variance, and then finding the standard deviation. Once you find the mean, you can use the mean and all the individual numbers to find the variance. Then, once you have the variance, take the square root to calculate the standard deviation.By breaking the problem down into 3 smaller sections, youll be able to use simple concepts to calculate the mean first, then the variance, and find the standard deviation. 1Ask questions in class to make sure you understand a concept. Statistics concepts generally build on previous concepts. Therefore, if you dont understand a concept, its likely you wont be able to understand the next concept either. As a result, its important that you take the time to ask any questions you have to make sure that you fully understand the concept at hand so you dont derail your learning.[17]If your teacher has already explained something but youre still confused, chances are other people in the class are still confused as well. Therefore, youll not only help yourself learn important concepts by asking questions in class, youll likely help others learn as well.2Ask your teacher for help outside of class if youre still confused. If youre struggling with a particular concept or unit in class, visit your teachers office hours and ask any questions you may still have. Your teachers job is to do what they can to help you understand, so theyll likely be happy to sit with you and take a bit of extra time explaining things.[18]In some cases, seeing a teacher during office hours can boost your participation grade, which can also help you pass the class.3Form a study group with some of your classmates. At the beginning of the semester, ask some people in your statistics class if they want to form a weekly or pre-test study group. Some people in your group may have a better grasp on certain concepts, while you may be able to help others understand something else.[19]Therefore, studying together can help you all learn the material and pass the class.4Use online videos and tutorials to help you with difficult concepts. Whether youre struggling because your teacher just isnt explaining something clearly or you havent mastered the foundational concepts, watching online tutorials can be a great way to get the extra instruction you need. There are hundreds of thousands of videos online that will first provide you with a problem you can write down, and then guide you through it so youll better understand what to do.[20]5Get a tutor if youre still struggling. Whether youre generally good at math or not, statistics class is challenging for almost everyone. Therefore, if youre having trouble understanding some of the concepts or find yourself falling behind in class, getting a statistics tutor is a great way to get the one-on-one help you need to pass the class.[21]Some schools offer free tutoring at their learning center, so you might want to look into this option if its available to you. Ask a Question This article was co-authored by wikiHow Staff. Our trained team of editors and researchers validate articles for accuracy and comprehensiveness. wikiHow's Content Management Team carefully monitors the work from our editorial staff to ensure that each article is backed by trusted research and meets our high quality standards. This article has been viewed 10,373 times. Co-authors: 3 Updated: December 1, 2019 Views:10,373 Thanks to all authors for creating a page that has been read 10,373 times. image:Cardiff UniversityOverview :Mean / Median /Mode/ Variance /Standard Deviation are all very basic but very important concept of statistics used in data science. Almost all the machine learning algorithm uses these concepts in data preprocessing steps. These concepts are part of descriptive statistics where we basically used to describe and understand the data for features in Machine learningMean :Mean is also known as average of all the numbers in the data set which is calculated by below equation.Lets say we have below heights of persons.heights=[168,170,150,160,182,140,175,191,152,150]Median :Median is mid value in this ordered data set.image:source unknownArrange the data in the increasing order and then find the mid value.If we have even number of values in the data set then median is sum of mid two numbers divided by 2In we have odd number in the data set like below we have 9 heights the median will be 5th number value.Mode :Mode is the number which occur most often in the data set.Here 150 is occurring twice so this is our mode.Variance :Variance is the numerical values that describe the variability of the observations from its arithmetic mean and denoted by sigma-squared(2 )Variance measure how far individuals in the group are spread out, in the set of data from the mean.image:Data Analysis in the GeosciencesWhereXi : Elements in the data setmu : the population mean=the population meanStep 1: This formula says that take each element from dataset(population) and subtract from mean of data set.Later sum all the values.Step 2: Take the sum in Step 1 and divide by total number of elements.Square in the above formula will nullify the effect of negative sign(-)Standard Deviation :It is a measure of dispersion of observation within dataset relative to their mean.It is square root of the variance and denoted by Sigma () .Standard deviation is expressed in the same unit as the values in the dataset so it measure how much observations of the data set differs from its mean.Conclusion : Mean / Median /Mode/ Variance /Standard Deviation are simple yet very important concept in statistics which all should know .Hope you like my article.Please hit Clap (50 times) to motivate me to write further.Want to connect :Linked In : you like my posts here on Medium and would wish for me to continue doing this work, consider supporting me on patreon Download Article Ace your next statistics test with this helpful walk-through Download Article Histograms, or frequency distributions, are statistical graphs that show how often a given value is observed in a set of data.[1] To find the median, or middle value, of a histogram, add up every value in your data set, then add 1, and divide the result by 2. If youre struggling with your stats homework, keep reading to get more detailed equations, plus tips on how to understand them. Add up all of the frequencies in the histogram. If you dont have the frequencies yet, multiply the x value range of each bar by their y value (height).If the value is odd, add 1 and divide by 2 to find the median. The equation is n+1/2 where n equals the total value of frequencies.If the value is even, find the average of the middle two numbers. The equation is n/2+(n/2+1)/21Determine the values of each bar on the histogram. If your problem doesnt give you the total value of a given bin (the x-axis range, for example, 1-5) of the histograms, multiply the bin by the y-axis value.[2]For example, if you have a bin with a range of 15 (1-15, 15-30, etc.) with a y-axis value of 20, the total value of that bin would be 15x20=300.Usually, the bins on a histogram are uniform (all 15 wide, for example), but if youre working on a homework assignment, your teacher may make the bins different ranges to make it more difficult.[3]For example, you may have a bin with a range of 20 and another with a range of 25.Consider writing your values in a frequency table. Frequency tables have two columns, one with values and one with how many times that value was recorded.[4] So if the value 1 was recorded 7 times and the value 2 was recorded 3 times, then the first row of the table would be 1,7 and the second would be 2,3. 2Add all of the frequencies together. Once you have the value of each bin, add all of them together to get the total value of frequencies on the graph.[5]So if you have 3 bins with ranges of 15, one with a y value of 20, one with a y value of 30, and one with a y value of 40, the total value of frequencies on the graph would be (15x20) + (15x30) + (15x40) = 1350.The sum of the frequencies is also the total area of the graph. Advertisement 3If the value is odd, add 1 to the total value, then divide it by two. In mathematical notation, the equation looks like n+1/2.[6] The median is the exact middle of a data set, so its the value of the number equidistant from 1 to the total sumFor example, 3 is the median of a data set with a summed value of 5: 5+1/2 = 3, 1, 2, 3, 4, 5.4If the value is even, take the average of the middle two numbers. Since even numbers dont have an exact middle, divide the number by 2, then find the average of that number and the following number.[7] In mathematical nomination, the equation is n/2+(n/2+1)/2.So if your total value were 10, you would find the median by plugging in 5 for n/2 and 6 for n/2 + 1. 10/2+(10/2+1)/2 = 5+6/2 = 5.5.5Estimate the exact value by using the equation L + (n/2 - F/f)w. Make L = the lower limit of the bin the median falls in, n = the sum of all the frequencies on the histogram, F = the sum of all the frequencies up to the median bin, f = the y value of the median bin, and w = the x value range of the median bin.[8]F represents a cumulative frequency. Calculate cumulative frequency by adding the total values of each bin up until the bin that the median falls in. So if your median is in the bin "30-40" and your graph starts at zero, add the total values of bins 0-10, 10-20, and 20-30.If your histograms total value was 180, your median bin had an x-value of 30-40 and a y value of 35, and the cumulative frequency up to that bin was 60, then your equation would look like (30+180/2 - 60/35)10 = (30+90 - 60/35)10 = (30+30/35)10 = (30+0.857)10 = 38.57.The result of this equation is the value on the x-axis that has equal areas on either side. So the area of the graph on the left is equal to the area of the graph on the right of the value.[9] Advertisement 1Add all of the values in the histogram. Multiply the width of each bin by the height (x-axis range of each bar by the y-axis value). [10] Then, add them all together. This is the same as calculating the area of the graph.2Divide the sum of the values by the number of data points. To find the average value in the graph, divide the total from the last step by the number of values that were recorded.[11] So if you have a graph with 15 data points that add up to 300, then the mean would be 300/15 = 20.It may help to make a frequency table. To make the table, write all of the values that were recorded in one column, then write how many times each given value was recorded in the next column.[12] Advertisement Ask a Question Advertisement Thanks for reading our article! If youd like to learn more about mathematics, check out our in-depth interview with Sophie Amphlett. This article was co-authored by Jake Adams and by wikiHow staff writer, Carmine Shannon. Jake Adams is an academic tutor and the owner of Simplifi EDU, a Santa Monica, California based online tutoring business offering learning resources and online tutors for academic subjects K-College, SAT & ACT prep, and college admissions applications. With over 14 years of professional tutoring experience, Jake is dedicated to providing his clients the very best online tutoring experience and access to a network of excellent undergraduate and graduate-level tutors from top colleges all over the nation. Jake holds a BS in International Business and Marketing from Pepperdine University. This article has been viewed 34,223 times. Co-authors: 4 Updated: March 4, 2024 Views:34,223 Categories: Mathematics PrintSend fan mail to authors Thanks to all authors for creating a page that has been read 34,223 times. The mean, the mode, the median, the range, and the standard deviation are all examples of descriptive statistics. Descriptive statistics are used because in most cases, it isn't possible to present all of your data in any form that your reader will be able to quickly interpret. Generally, when writing descriptive statistics, you want to present at least one form of central tendency (or average), that is, either the mean, median, or mode. In addition, you should present one form of variability, usually the standard deviation.Measures of Central Tendency and Other Commonly Used Descriptive StatisticsThe mean, median, and the mode are all measures of central tendency. They attempt to describe what the typical data point might look like. In essence, they are all different forms of 'the average.' When writing statistics, you never want to say 'average' because it is difficult, if not impossible, for your reader to understand if you are referring to the mean, the median, or the mode.The MeanThe mean is the most common form of central tendency, and is what most people usually are referring to when the say average. It is simply the total sum of all the numbers in a data set, divided by the total number of data points. For example, the following data set has a mean of 4: {-1, 0, 1, 16}. That is, 16 divided by 4 is 4. If there isn't a good reason to use one of the other forms of central tendency, then you should use the mean to describe the central tendency.The MedianThe median is simply the middle value of a data set. In order to calculate the median, all values in the data set need to be ordered, from either highest to lowest, or vice versa. If there are an odd number of values in a data set, then the median is easy to calculate. If there is an even number of values in a data set, then the calculation becomes more difficult. Statisticians still debate how to properly calculate a median when there is an even number of values, but for most purposes, it is appropriate to simply take the mean of the two middle values. The median is useful when describing data sets that are skewed or have extreme values. Incomes of baseball players, for example, are commonly reported using a median because a small minority of baseball players makes a lot of money, while most players make more modest amounts. The median is less influenced by extreme scores than the mean.{-2, 1, 3, 10, 500, 1000}Here the median is 6.5: [(3+10)/2]{30, 30, 50, 50, 60}Here the median is 50. The mode is the most commonly occurring number in the data set. The mode is best used when you want to indicate the most common response or item in a data set. For example, if you wanted to predict the score of the next football game, you may want to know what the most common score is for the visiting team, but having an average score of 15.3 won't help you if it is impossible to score 15.3 points. Likewise, a median score may not be very informative either, if you are interested in what score is most likely.{1, 2, 3, 4, 10, 10, 10}Here the mode is 10. The standard deviation is a measure of variability (it is not a measure of central tendency). Conceptually it is best viewed as the 'average distance that individual data points are from the mean.' Data sets that are highly clustered around the mean have lower standard deviations than data sets that are spread out.For example, the first data set would have a higher standard deviation than the second data set:{1,2,3,4,5,6,7,8,9}Standard Deviation = 2.58{4,4,4,5,5,5,6,6,6}Standard Deviation = 0.82Notice that both groups have the same mean (5) and median (also 5), but the two groups contain different numbers and are organized much differently. This organization of a data set is often referred to as a distribution. Because the two data sets above have the same mean and median, but different standard deviation, we know that they also have different distributions. Understanding the distribution of a data set helps us understand how the data behave. This article was published as a part of theData Science Blogathon. Table of contents Data is largely divided into two major categories, quantitative and qualitative. They are further divided into other parts. Refer to the graph given below for reference Quantitative data: This type of data consists of numerical values that can be measured or counted. Examples include time, speed, temperature, and the number of items. Qualitative data: This type includes non-numerical values representing qualities or attributes. Examples include colors, yes or no responses, and opinions.Discrete data: This refers to separate and distinct values, typically counting numbers. For instance, the numbers on a dice or the number of students in a class are discrete data points. Continuous data: This type of data can take on any value within a range and be measured with high precision. Examples include height, weight, and temperature. Data can be further classified into four types based on the level of measurement: nominal, ordinal, interval, and ratio. Nominal data: This represents categorical information without any inherent order or ranking. Examples include gender, religion, or marital status. Ordinal data: This type has a defined order or ranking among the values. Examples include exam grades (A, B, C) or positions in a competition (1st place, 2nd place, 3rd place). Interval data: Interval data has a defined order and equal intervals between the values. An example is the Celsius temperature scale, where the difference between 30C and 20C is the same as the difference between 20C and 10C. Ratio data: Ratio data possesses all the characteristics of interval data but has a meaningful zero point. In addition to setting up inequalities, ratios can also be formed with this data type. Examples include height, weight, or income. We should first understand the term Central Tendency. Data tend to accumulate around the average value of the total data under consideration. Measures of central tendency will help us to find the middle, or the average, of a data set. If most of the data is centrally located and there is a very small spread it will form an asymmetric bell curve. In such conditions values of mean, median and mode are equal. Lets understand the definition and role of mean, median and mode with the help of examples It is the average of values. Consider 3 temperature values 30 oC, 40 oC and 50 oC, then the mean is (30+40+50)/3=40 oC. It is the centrally located value of the data set sorted in ascending order. Consider 11 (ODD) values 1,2,3,7,8,3,2,5,4,15,16. We first sort the values in ascending order 1,2,2,3,3,4,5,7,8,15,16 then the median is 4 which is located at the 6th number and will have 5 numbers on either side. If the data set is having an even number of values then the median can be found by taking the average of the two middle values. Consider 10 (EVEN) values 1,2,3,7,8,3,2,5,4,15. We first sort the values in ascending order 1,2,2,3,3,4,5,7,8,15 then the median is (3+4)/2=3.5 which is the average of the two middle values i.e. the values which are located at the 5th and 6th number in the sequence and will have 4 numbers on either side. It is the most frequent value in the data set. We can easily get the mode by counting the frequency of occurrence. Consider a data set with the values 1,5,5,6,8,2,6,6. In this data set, we can observe the following, The value 6 occurs the most hence the mode of the data set is 6. We often test our data by plotting the distribution curve, if most of the values are centrally located and very few values are off from the center then we say that the data is having a normal distribution. At that time the values of mean, median, and mode are almost equal. However, when our data is skewed, for example, as with the right-skewed data set below: We can say that the mean is being dragged in the direction of the skew. In this skewed distribution, mode < median < mean. The more skewed the distribution, the greater the difference between the median and mean, here we consider median for the conclusion. The best example of the right-skewed distribution is salaries of employees, where higher-earners provide a false representation of the typical income if expressed as mean salaries and not the median salaries. For left-skewed distribution mean < median < mode. In such a case also, we emphasize the median value of the distribution. To understand this let us consider an example. An OTT platform company has conducted a survey in a particular region based on the watch time, language of streaming, and age of the viewer. For our understanding, we have taken a sample of 10 people. df=pd.read_csv("viewer.csv") df df["Watch Time"].mean()2.5df["Watch Time"].mode()0 1.5dtype: float64df["Watch Time"].median()2.0 If we observe the values then we can conclude the value of Mean Watch Time is 2.5 hours and which appears reasonably correct. For Age of viewer following results can be obtained, df["Age"].median()12.5df["Age"].mean()19.9df["Age"].mode()0 121 15dtype: int64 The value of mean Age is looked somewhat away from the actual data. Most of the viewers are in the range of 10 to 15 while the value of mean comes 19.9. This is because the outliers present in the data set. We can easily find the outliers using a boxplot. sns.boxplot(df['Age'], orient='vertical') If we observe the value of Median Age then the result looks correct. The value of mean is very sensitive to outliers. Now for the most popular language, we can not calculate the mean and median since this is nominal data. sns.barplot(x="Language",y="Age",data=df) sns.barplot(x="Language",y="Watch Time",data=df) If we observe the graph then it is seen that the Tamil bar is largest for Language vs Age and Language vs Watch Time graph. But this will mislead the result because there is only one person who watches the shows in Tamil. df["Language"].value_counts()Hindi 4English 3Tamil 1Telgu 1Marathi 1Name: Language, dtype: int64df["Language"].mode()0 Hindidtype: object From the above result, it is concluded that the most popular language is Hindi. This is observed when we find the mode of the data set. Hence from the above observation, it is concluded that in the sample survey average age of viewers is 12.5 years who watch for 2.5 hours daily a show in the Hindi language. We can say there is no best central tendency measure method because the result is always based on the types of data. For ordinal, interval, and ratio data (if it is skewed) we can prefer median. For Nominal data, the model is preferred and for interval and ratio data (if it is not skewed) mean is preferred. Dispersion measures indicate how data values are spread out. The range, which is the difference between the highest and lowest values, is a simple measure of dispersion. The standard deviation measures the expected difference between a data value and the mean. Q1. What are the 4 measures of central tendency? A. The four measures of central tendency are mean, median, mode, and midrange. Central tendency examples include finding the average age in a group, determining the middle value of test scores, or identifying the most frequently occurring color in a survey. Q2. What is central tendency examples? A. To find central tendency, calculate the mean by summing all values and dividing by the total number, find the median by locating the middle value, or determine the mode as the most commonly occurring value. Q3. How do I find central tendency? A. The best measure of central tendency depends on the type of data and the specific context of the analysis. The mean is commonly used, but other measures may be more appropriate in certain situations. The media shown in this article are not owned by Analytics Vidhya and is used at the Authors discretion.

**Mean mode median standard deviation. What is mean median mode range and standard deviation. Mean mode median. Define mean median mode range and standard deviation psychology. Mean value and standard deviation. What is mean range mode and median. Find the mean median mode range and standard deviation. Define mean median mode and standard deviation.**