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Decile is a statistical measure that divides a dataset into ten equal parts, and each part contains 10% of the data. It is different from percentage as in percentage there are 100 parts. In this article, we will learn in detail about what is decile, the formulas of decile (grouped data and ungrouped data) What is Decile?A decile is a quantitative method of dividing data into 10 equal parts. Suppose there is a list of numbers, then the data in the list can be put in order from smallest to largest, and then split into 10 groups with an equal number of numbers in each group. This method is often used in finance and economics studies to help understand and analyze data. Deciles are different from percentiles, and quintiles quartiles, which divide data into 100 parts, 4 parts, and 5 parts respectively. Definition of DecileSplitting a group of data into 10 equal parts is defined as a decile. There are 9 points to divide the data and make sections that each represent 1/10th of the whole. Decile helps arrange a large amount of data in either ascending or descending order. This arrangement of data is done on a scale of 1 to 10, where each step represents an increase of 10 percentage points. Formula of DecileDecile has two ways to be calculated based on the type of data. Formula of Decile The two formulas to calculate decile are: Decile Formula for Ungrouped DataDecile Formula for Grouped DataDecile Formula for Ungrouped DataTo find the decile for ungrouped data, first, the data needs to be arranged in ascending order. Then, the following formula is applied: Decilen = (n/10) × (N + 1) where, Decilen represents the nth decile.n is the decile number (e.g., 1st decile, 2nd decile, etc.).N is the total number of data points.Decile Formula for Grouped DataTo calculate the decile of a grouped data, cumulative frequency is used. The formula to find the decile of a grouped date is as follows: Decilen = L + \left(\frac{\left(\frac{n}{10} \times N \right) - F}{f} \right) \times c where, Decilen represents the nth decile.n is the decile number (e.g., 1st decile, 2nd decile, etc.).L is the lower boundary of the decile class.N is the total frequency.F is the cumulative frequency of the class preceding the decile class.f is the frequency of the decile class.c is the class width.Decile Class RankDecile class rank refers to a method of ranking students based on their academic performance relative to their peers within their class. The class is divided into ten equal parts or "deciles," with each decile representing 10% of the class. How to Calculate Decile?Calculate the decile of any given set of data following the steps given below: Sort the Data: Arrange the data points in ascending order from smallest to largest. Identify Decile Number: Decide which decile you want to find (e.g., 1st decile, 2nd decile, etc.). Calculate Position: For ungrouped data, use the formula: Decilen = (n/10)×(N+1) Where: Decilen is the nth decile.n is the decile number.N is the total number of data points.NOTE: For grouped data, use cumulative frequency to find the position of the decile. Find the Value: Once you have the position, locate the corresponding value in the sorted data set. This value represents the decile. Examples of DecileFor example, Suppose we have a data set consisting of the following numbers representing the scores of students in a math test: 65, 72, 84, 57, 68, 75, 80, 92, 88, 78, 60, 70, 85, 95, 62, 73, 79, 83, 90, 77. Step 1: Arrange the data in increasing order. This gives us: 57, 60, 62, 65, 68, 70, 72, 73, 75, 77, 78, 79, 80, 83, 84, 85, 88, 90, 92, 95. Step 2: Identify the total number of points. Here, n=20. Step 3: Apply the decile formula to calculate the position of the required data point. D(1) = (n+1) / 10 = 21/10 = 2.1 This implies the value of the 2.1st data point has to be determined. This will lie between the scores in the 2nd and 3rd positions. In other words, the 2.1st data point is 0.1 of the way between the scores 60 and 62. Step 4: The value of the decile can be determined as lower score+(distance)(higher score−lower score). This is given as 60 + 0.1 × (62−60) = 60 + 0.1 × 2 = 60 + 0.2 = 60.2 Step 5: Apply steps 3 and 4 to determine the rest of the deciles. D(2) = 2 × (n+1) / 10 = 4.2th data between digits 4 and 5. Thus, 62 + 0.2 × (65-62) = 62 + 0.2 × 3 = 62 + 0.6 = 62.6 Solved Examples on DecileExample 1: Given the following grouped data representing the scores of students in a class: Score Range Frequency 0-10 5 11-20 8 21-30 12 31-40 15 41-50 10 Find the first decile for this data. Solution: First we will calculate the cumulative Frequency Frequency Cumulative Frequency 5 5 8 13 12 25 15 40 10 50 Total number of observations (N) = 5 + 8 + 12 + 15 + 10 = 50 Position of Decile D1 = N/10 = 50/10 = 5 Now, cumulative frequency just greater than D1 is corresponding to the score range 11-20 Now we know, that for ungrouped data D(n) = L + \left(\frac{\left(\frac{n}{10} \times N \right) - F}{f} \right) \times c where, L is Lower boundary of the score range containing D1 (11 in this case)F is Cumulative frequency of the score range before D1 (5)f is Frequency of the score range containing D1 (8)w is Width of the score range (10 - 0 = 10)Putting the values in the formula we get, D1 = 11 + \left(\frac{5 - 5}{8} \right) × 10 D1 = 11 + (0/8) × 10 D1 = 11 + 0 × 10 ∴ D1 = 11 Example 2: Given the following ungrouped data representing the ages of ten individuals: 22,25,30,33,35,40,45,50,55,60. Find the deciles for this data. Solution: First, we will arrange the given data in ascending order: 22, 25, 30, 33, 35, 40, 45, 50, 55, 60. Now using the formula of calculating decile; D(n) = N × (n +1) /10 we will find the deciles. Where, N is the total frequency, and n ranges from 1 to 9 First Decile D(1) = 1 × (9 +1) /10 = 10/10 =1 Second Decile D(2) = 2 × (9 +1) /10 = 20/10 = 2 Third Decile D(3) = 3 × (9 +1) /10 = 30/10 = 3 Fourth Decile D(4) = 4 × (9 +1) /10 = 40/10 = 4 Fifth Decile D(5) = 5 × (9 +1) /10 = 50/10 = 5 Sixth Decile D(6) = 6 × (9 +1) /10 = 60/10 = 6 Seventh Decile D(7) = 7 × (9 +1) /10 = 70/10 = 7 Eighth Decile D(8) = 8 × (9 +1) /10 = 80/10 = 8 Ninth Decile D(9) = 9 × (9 +1) /10 = 90/10 = 9 Practice Questions on DecileQ1. Calculate the value of the 3rd decile for the following set of data: 12, 15, 18, 20, 22, 25, 28, 30, 32, 35. Q2. Given the cumulative frequency distribution below, determine the value of the 7th decile: Data Cumulative Frequency 10-20 20-30 30-40 40-50 50-60 10 25 35 45 50 Q3. Determine the 5th decile for the following set of data 18, 22, 25, 30, 35, 40, 45, 50, 55, 60. Q4. The following data represents the marks obtained by 60 students in a test: 45 52 58 63 68 72 75 80 85 90 47 53 59 64 69 73 76 81 86 91 48 54 60 65 70 74 77 82 87 92 50 55 61 66 71 78 83 88 93 98 51 56 62 67 79 84 89 94 76 67 Determine the value of the 9th decile. Share — copy and redistribute the material in any medium or format for any purpose, even commercially. Adapt — remix, transform, and build upon the material for any purpose, even commercially. The licensor cannot revoke these freedoms as long as you follow the license terms. Attribution — You must give appropriate credit , provide a link to the license, and indicate if changes were made . You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. ShareAlike — If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original. No additional restrictions — You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits. You do not have to comply with the license for elements of the material in the public domain or where your use is permitted by an applicable exception or limitation . No warranties are given. The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material. A decile is a method of splitting up a set of ranked data into 10 equally large subsections. If you're in the 2nd decile, you're in the top 20%, if your in the 3rd decile your in the top 30%, and so on. The 2nd decile is a good place to be. Welcome to the Statistics Library. This Living Library is a principal hub of the LibreTexts project, which is a multi-institutional collaborative venture to develop the next generation of open-access texts to improve postsecondary education at all levels of higher learning. The LibreTexts approach is highly collaborative where an Open Access textbook environment is under constant revision by students, faculty, and outside experts to supplant conventional paper-based books. Campus BookshelvesBookshelvesLearning Objects Home is shared under a not declared license and was authored, remixed, and/or curated by LibreTexts. Deciles are the values of arranged data which divide whole data into ten equal parts. They are 9 in numbers namely $D_1,D_2, \cdots, D_9$. Here D_1 is first decile, D_2 is second decile, D_3 is third decile and so on. Formula The formula for i^{th} decile is $D_i =$ Value of $\bigg(\dfrac{i(n+1)}{10}\bigg)^{th}$ observation, $i=1,2,3,\cdots, 9$ where, n is the total number of observations. Example 1 The marks obtained by a sample of 20 students in a class test are as follows: 20,30,21,29,10,17,18,15,27,25,16,15,19,22,13,17,14,18,12 and 9. Find a. the upper marks for the lowest 20 % of the students,, b. the upper marks for the lowest 50 % of the students, c. the lower marks for the upper 10 % of the students. Solution The formula for i^{th} decile is $D_i =$ Value of $\bigg(\dfrac{i(n+1)}{10}\bigg)^{th}$ observation, $i=1,2,3,\cdots, 9$ where n is the total number of observations. Arrange the data in ascending order 9, 10, 12, 13, 14, 15, 15, 16, 17, 17, 18, 18, 19, 20, 21, 22, 25, 27, 29, 30 a. The upper marks for the lowest 20 % of the students is D_2. The second decile D_2 can be computed as follows: $$ \begin{aligned} D_{2} &=\text{Value of }\bigg(\dfrac{2(n+1)}{10}\bigg)^{th} \text{ obs.}\\ &=\text{Value of }\bigg(\dfrac{2(20+1)}{10}\bigg)^{th} \text{ obs.}\\ &= \text{Value of }\big(4.2\big)^{th} \text{ obs.}\\ &= \text{Value of }\big(4\big)^{th} \text{ obs.}+0.2 \big(\text{Value of } \big(5\big)^{th}\text{ obs.}-\text{Value of }\big(4\big)^{th} \text{ obs.}\big)\\ &=13+0.2\big(14 -13\big)\\ &=13.2 \text{ marks} \end{aligned} $$ Thus, the upper limit of marks obtained by the students for the lowest 20 % of the students is 13.2 marks. b. The upper marks for the lowest 50 % of the students is D_5. The fifth decile D_5 can be computed as follows: $$ \begin{aligned} D_{5} &=\text{Value of }\bigg(\dfrac{5(n+1)}{10}\bigg)^{th} \text{ obs.}\\ &=\text{Value of }\bigg(\dfrac{5(20+1)}{10}\bigg)^{th} \text{ obs.}\\ &= \text{Value of }\big(10.5\big)^{th} \text{ obs.}\\ &= \text{Value of }\big(10\big)^{th} \text{ obs.}+0.5 \big(\text{Value of } \big(11\big)^{th}\text{ obs.}-\text{Value of }\big(10\big)^{th} \text{ obs.}\big)\\ &=17+0.5\big(18 -17\big)\\ &=17.5 \text{ marks} \end{aligned} $$ Thus, the upper limit of marks obtained by the students for the lowest 50 % of the students is 17.5 marks. c. The lower marks for the upper 10 % of the students is D_9. The nineth decile D_9 can be computed as follows: $$ \begin{aligned} D_{9} &=\text{Value of }\bigg(\dfrac{9(n+1)}{10}\bigg)^{th} \text{ obs.}\\ &=\text{Value of }\bigg(\dfrac{9(20+1)}{10}\bigg)^{th} \text{ obs.}\\ &= \text{Value of }\big(18.9\big)^{th} \text{ obs.}\\ &= \text{Value of }\big(18\big)^{th} \text{ obs.}+0.9 \big(\text{Value of } \big(19\big)^{th}\text{ obs.}-\text{Value of }\big(18\big)^{th} \text{ obs.}\big)\\ &=27+0.9\big(29 -27\big)\\ &=28.8 \text{ marks} \end{aligned} $$ Thus, the lower marks obtained by the students for the upper 10 % of the students is 28.8 marks. Example 2 Blood sugar level (in mg/dl) of a sample of 20 patients admitted to the hospitals are as follows: 75,89,72,78,87, 85, 73, 75, 97, 87, 84, 76,73,79,99,86,83,76,78,73. Find a. the upper limit of Blood sugar level for the lowest 10 % of the patients, b. the upper limit of Blood sugar level for the lowest 30 % of the patients, c. the lower limit of Blood sugar level for the upper 20 % of the patients. Solution The formula for i^{th} decile is $D_i =$ Value of $\bigg(\dfrac{i(n+1)}{10}\bigg)^{th}$ observation, $i=1,2,\cdots, 9$ where n is the total number of observations. Arrange the data in ascending order 72, 73, 73, 73, 75, 75, 76, 76, 78, 78, 79, 80, 82, 83, 84, 85, 86, 87, 97, 99 a. The upper limit of blood sugar level for the lowest 10% of the patients is D_1. The first decile D_1 can be computed as follows: $$ \begin{aligned} D_{1} &=\text{Value of }\bigg(\dfrac{1(n+1)}{10}\bigg)^{th} \text{ observation}\\ &=\text{Value of }\bigg(\dfrac{1(20+1)}{10}\bigg)^{th} \text{ obs.}\\ &= \text{Value of }\big(2.1\big)^{th} \text{ obs.}\\ &= \text{Value of }\big(2\big)^{th} \text{ obs.}+0.1 \big(\text{Value of } \big(3\big)^{th}\text{ obs.}-\text{Value of }\big(2\big)^{th} \text{ obs.}\big)\\ &=73+0.1\big(73 -73\big)\\ &=73 \text{ mg/dl} \end{aligned} $$ Thus, the upper limit of blood sugar level for the lowest 10 % of the patients is 73 mg/dl. b. The upper limit of blood sugar level for the lowest 30% of the patients is D_3. The third decile D_3 can be computed as follows: $$ \begin{aligned} D_{3} &=\text{Value of }\bigg(\dfrac{3(n+1)}{10}\bigg)^{th} \text{ obs.}\\ &=\text{Value of }\bigg(\dfrac{3(20+1)}{10}\bigg)^{th} \text{ obs.}\\ &= \text{Value of }\big(6.3\big)^{th} \text{ obs.}\\ &= \text{Value of }\big(6\big)^{th} \text{ obs.}+0.3 \big(\text{Value of } \big(7\big)^{th}\text{ obs.}-\text{Value of }\big(6\big)^{th} \text{ obs.}\big)\\ &=75+0.3\big(76 -75\big)\\ &=75.3 \text{ mg/dl}. \end{aligned} $$ Thus, the upper limit of blood sugar level for the lowest 30 % of the patients is 75.3 mg/dl. c. The lower limit of blood sugar level for the upper 20% of the patients is D_8. (because above D_8 upper 20% patients lies) The eigth decile D_8 can be computed as follows: $$ \begin{aligned} D_{8} &=\text{Value of }\bigg(\dfrac{8(n+1)}{10}\bigg)^{th} \text{ obs.}\\ &=\text{Value of }\bigg(\dfrac{8(20+1)}{10}\bigg)^{th} \text{ obs.}\\ &= \text{Value of }\big(16.8\big)^{th} \text{ obs.}\\ &= \text{Value of }\big(16\big)^{th} \text{ obs.}+0.8 \big(\text{Value of } \big(17\big)^{th}\text{ obs.}-\text{Value of }\big(16\big)^{th} \text{ obs.}\big)\\ &=85+0.8\big(86 -85\big)\\ &=85.8\text{ mg/dl} \end{aligned} $$ Thus, the lower limit of blood sugar level level for the upper 20 % of the patients is 85.8 mg/dl. Related Resources Decile is a method that is used to divide a distribution into ten equal parts. When data is divided into deciles a decile rank is assigned to each data point in order to sort the data into ascending or descending order. A decile has 10 categorical buckets while a quartile has 4 and a percentile has 100. The concept of a decile is used widely in the field of finance and economics to perform the analysis of data. It can be used to check the performance of a portfolio in the field of finance. In this article, we learn more about a decile, its definition, rank, and see associated examples on calculating the decile value. What is Decile? Decile, percentile, quartile, and quintile are different types of quantiles in statistics. A quantile refers to a value that divides the observations in a sample into equal subsections. There will always be 1 lesser quantile than the number of subsections created. Decile Definition Decile is a type of quantile that divides the dataset into 10 equal subsections with the help of 9 data points. Each section of the sorted data represents 1/10 of the original sample or population. Decile helps to order large amounts of data in the increasing or decreasing order. This ordering is done by using a scale from 1 to 10 where each successive value represents an increase by 10 percentage points. Decile Class Rank To split the given data and order it according to some specified metric, statisticians use the decile rank also known as decile class rank. Once the given data is divided into deciles then each subsequent data set is assigned a decile rank. Each rank is based on an increase by 10 percentage points and is used to order the deciles in the increasing order. The 5th decile of a distribution will give the value of the median. Decile Formula The decile formulas can be used to calculate the deciles for grouped and ungrouped data. When data is in its raw form it is known as ungrouped data. When this data is sorted and organized then it forms grouped data. These are given as follows: Decile Formula for ungrouped data: D(x) = Value of the \(\frac{x(n+1)}{10}\)th term in the data set. x is the value of the decile that needs to be calculated and ranges from 1 to 9. n is the total number of observations in that data set. Decile Formula for grouped data: D(x) = \(l+\frac{w}{f}\left (\frac{Nx}{10} -C\right)\). l is the lower boundary of the class containing the decile given by (x × cf) / 10, cf is the cumulative frequency of the entire data set, w is the size of the class, N is the total frequency, C is the cumulative frequency of the preceding class. The next section will cover the steps for calculating a particular decile. Decile Example Suppose a data set consists of the following numbers: 24, 32, 27, 32, 23, 62, 45, 80, 59, 63, 36, 54, 57, 36, 72, 55, 51, 32, 56, 33, 42, 55, 30. The value of the first two deciles has to be calculated. The steps required are as follows: Step 1: Arrange the data in increasing order. This gives 23, 24, 27, 30, 32, 32, 32, 33, 36, 36, 42, 45, 51, 54, 55, 55, 56, 57, 59, 62, 63, 72, 80. Step 2: Identify the total number of points. Here, n = 23 Step 3: Apply the decile formula to calculate the position of the required data point. D(1) = \(\frac{(n+1)}{10}\) = 2.4. This implies the value of the 2.4th data point has to be determined. This will lie between the scores in the 2nd and 3rd positions. In other words, the 2.4th data is 0.4 of the way between the scores 24 and 27 Step 4: The value of the decile can be determined as [lower score + (distance)(higher score - lower score)]. This is given as 24 + 0.4 * (27 – 24) = 25.2 Step 5: Apply steps 3 and 4 to determine the rest of the deciles. D(2) = \(\frac{2(n+1)}{10}\) = 4.8th data between digit number 4 and 5. Thus, 30 + 0.8 * (32 – 30) = 31.6 Related Articles: Probability and Statistics Data Handling Summary Statistics Important Notes on Decile A decile is a quantile that is used to divide a data set into 10 equal subsections. The 5th decile will be the median for the dataset. The decile formula for ungrouped data is given as \(\frac{x(n+1)}{10}\)th term in the data set. The decile formula for grouped data is given by \(l+\frac{w}{f}\left (\frac{Nx}{10} -C\right)\). Example 1: Find the 6th and the 9th decile for the data in the above-mentioned example. Solution: The arranged data is 23, 24, 27, 30, 32, 32, 32, 33, 36, 36, 42, 45, 51, 54, 55, 55, 56, 57, 59, 62, 63, 72, 80 n = 23 D(6) = \(\frac{6(n+1)}{10}\) = 14.4th data. This lies between 54 and 55. D(6) = 54 + 0.4 * (55 – 54) = 54.4 D(9) = \(\frac{9(n+1)}{10}\) = 21.6th data. This lies between 63 and 72 D(9) = 63 + 0.6 * (72 – 63) = 68.4 Answer: D(5) = 54.4 and D(9) = 68.4 Example 2: Find the median of the following data set using the concept of deciles. 55, 58, 61, 67, 68, 70, 74, 81, 82, 93, 20, 28, 29, 30, 36, 37, 39, 42, 53, 54 Solution: Arranging the data in increasing order 20, 28, 29, 30, 36, 37, 39, 42, 53, 54, 55, 58, 61, 67, 68, 70, 74, 81, 82, 93 The fifth decile is the median of the data set, thus, n = 20 D(5) = \(\frac{5(n+1)}{10}\) = 10.5th data. This lies between D(5) = 54 + 0.5* (55 - 54) = 54.5 Example 3: Find the 7th decile for the following frequency distribution table. Class Frequency 10 - 20 15 20 - 30 10 30 - 40 12 40 - 50 8 50 - 60 7 60 - 70 18 70 - 80 5 80 - 90 25 Solution: From the given frequency distribution table, we can have, Class Frequency Cumulative Frequency (cf) 10 - 20 15 15 20 - 30 10 25 30 - 40 12 37 40 - 50 8 45 50 - 60 7 52 60 - 70 18 70 70 - 80 5 75 80 - 90 25 100 D(7) = \(\frac{7\times 100}{10}\) = 70th data in the cf column This data lies in the 60 - 70 class D(7) = \(l+\frac{w}{f}\left (\frac{Nx}{10} -C\right)\) = \(60+\frac{10}{18}\left (\frac{7 \times 100}{10} -52\right)\) = 70 Show more > go to slidego to slidego to slide Breakdown tough concepts through simple visuals. Math will no longer be a tough subject, especially when you understand the concepts through visualizations. Book a Free Trial Class FAQs on Decile A decile in statistics is a method to divide the distribution into 10 equal parts by using 9 data points and assigning decile ranks to each point. What is a Decile Class Rank? Once the data set is sorted into deciles then a decile class rank is assigned to each point so as to arrange these deciles into increasing order. What is the Decile Formula? The decile formula for ungrouped data is determined by the value of the \(\frac{x(n+1)}{10}\) term. The formula for grouped data is \(l+\frac{w}{f}\left (\frac{Nx}{10} -C\right)\). How to Find the Value of the Median Using the Decile Formula? The value of the 5th decile represents the median. For ungrouped data the median will be given by D(5) = \(\frac{5(n+1)}{10}\)th term. How to Interpret the First Decile? The first decile is a point such that 90% of the data lies above it and 10% of the data lies below it. Similarly, the 2nd decile is a point with 20% of data lying below it and 80% lying above it. How to Calculate the Decile for Ungrouped Data? The steps to calculate the decile for ungrouped data are as follows: Arrange the data in increasing order. Find the position of the decile using the formula D(x) = \(\frac{x(n+1)}{10}\) to check between which scores the decile will be. Find the value of the decile [lower score + (distance)(higher score - lower score)] What are the Applications of Decile? The concept of decile is widely used in the finance and economics industries to assess the performance of a mutual fund or a portfolio. It acts as a comparative number to measure the performance of an asset. Decile FormulaHigh SchoolMathStatistics & ProbabilityThe nth decile is the value that divides the data into ten equal parts. The formula involves sorting the data, calculating the index, and finding the corresponding value. Chat with our AI personalitiesDevinI've poured enough drinks to know that people don't always want advice—they just want to talk.What smells deter bears?Why are there craters on the moon?Ask a question and get an instant answerPick a number 1-10? Asked by Anonymous Quantile dividing data into 10 equal parts In descriptive statistics, a decile is any of the nine values that divide the sorted data into ten equal parts, so that each part represents 1/10 of the sample or population.[1] A decile is one possible form of a quantile; others include the quartile and percentile.[2] A decile rank arranges the data in order from lowest to highest and is done on a scale of one to ten where each successive number corresponds to an increase of 10 percentage points. A moderately robust measure of central tendency - known as the decile mean - can be computed by making use of a sample's deciles D 1 {\displaystyle D_{1}} to D 9 {\displaystyle D_{9}} (D 1 {\displaystyle D_{1}} = 10th percentile, D 2 {\displaystyle D_{2}} = 20th percentile and so on). It is calculated as follows:[3] D M = ∑ i = 1 9 D i 9 {\displaystyle DM={\frac {\sum _{i=1}^{9}D_{i}}{9}}} Apart from serving as an alternative for the mean and the truncated mean, it also forms the basis for robust measures of skewness and kurtosis, and even a normality test.[4] Summary statistics Socio-economic decile (for New Zealand schools) ^ Lockhart, Robert S. (1998), Introduction to Statistics and Data Analysis: For the Behavioral Sciences, Macmillan, p. 78, ISBN 9780716729747. ^ Sheskin, David J. (2003), Handbook of Parametric and Nonparametric Statistical Procedures (3rd ed.), CRC Press, p. 10, ISBN 9781420036268. ^ Rana, Sohel; Siraj-Ud-Doulah, Md.; Midi, Habshah; Imon, A. H. M. Rahmatullah (2012). "Decile mean: A new robust measure of central tendency" (PDF). Chiang Mai Journal of Science. 39 (3): 478–485. ^ Siraj-Ud-Doulah, Md. (2021). "An Alternative Measures of Moments Skewness Kurtosis and JB Test of Normality". Journal of Statistical Theory and Applications. 20 (2): 219–227. doi:10.2991/jsta.d.210525.002. This statistics-related article is a stub. You can help Wikipedia by expanding it.vte Retrieved from " Updated October 3, 2023 Decile Formula (Table of Contents) What is a Decile Formula? Decile is a statistical term that divides the data into ten defined intervals. It basically divides the data points into a data set in 10 equal parts on the number line. This type of data ranking is used in many fields like finance and economics etc. One thing to bear in mind is that data points can be random, so we must first line up those numbers in ascending order on the number line before dividing them into deciles. Once we divide the data, decile ranking can be given: Like other tools, quartile, and percentile, decile is also a method that divides data into smaller parts that are easier to measure, analyze and understand. Formula For Decile: Let's say that we have a data set with N data points: X – {X1, X2, X3..... XN} The formula for Deciles is given by: Di = (N + 1) * i / 10 D1 = (N+1) * 1 / 10 D2 = (N+1) * 2 / 10 And so on till D9 = (N+1) * 9 / 10 From the above formula, we can see D5 = (N+1) * 5 /10 = (N+1)/2, which is the median. So 5th decile represents the median. For grouped data: Di = L + (h / f) * (i * (N / 10) – C) Where: i = 1, 2, 3, 4, 5..., 9 L – Lower boundary of a group h – Width f – frequency N – Total number of data points C – Cumulative frequency preceding to that class Examples of Decile Formula (With Excel Template) Let's take an example to understand the calculation of Decile in a better manner. Decile Formula – Example #1 Let's say we have a data set which contains 39 data points. Calculate the Deciles. Data Set: Solution: First of all, we have to arrange this in ascending order, i.e., from lowest to highest. The decile is calculated using the formula given below Di = (N + 1) * i / 10 The result will be as given below. Similarly, calculate all the points. Now D1 = (39 + 1) * 1 / 10 = 40 / 10 = 4th data point = 10 D2 = (39 + 1) * 2 / 10 = 80 / 10 = 8th data point = 17 D3 = (39 + 1) * 3 / 10 = 120 / 10 = 12th data point = 38 D4 = (39 + 1) * 4 / 10 = 160 / 10 = 16th data point = 49 D5 = (39 + 1) * 5 / 10 = 200 / 10 = 20th data point = 58 D6 = (39 + 1) * 6 / 10 = 240 / 10 = 24th data point = 64 D7 = (39 + 1) * 7 / 10 = 280 / 10 = 28th data point = 73 D8 = (39 + 1) * 8 / 10 = 320 / 10 = 32th data point = 84 D9 = (39 + 1) * 9 / 10 = 360 / 10 = 36th data point = 91 If you see the data set, the median of this set is (n + 1)/2 = 40 / 2 = 20th value, i.e. 58, the same as D5. Decile Formula – Example #2 Consider the frequency table shown below, for which you need to calculate the deciles. From the above image, we have given the following information. Decile is calculated using the given formula: Di = L + (h / f) * (I * (N / 10) – C) The result will be as given below: Similarly, calculate for other values. Di = L + (h / f) * (i * (N / 10) – C) D1 = 10 + (10 / 8) * (1 * (70 / 10) – 0) = 18.75 D2 = 20 + (10 / 12) * (2 * (70 / 10) – 8) = 25 D3 = 30 + (10 / 14) * (3 * (70 / 10) – 20) = 30.7 D4 = 40 + (10 / 10) * (4 * (70 / 10) – 34) = 34 D5 = 50 + (10 / 6) * (5 * (70 / 10) – 44) = 35 D6 = 60 + (10 / 16) * (6 * (70 / 10) – 50) = 55 D7 = 70 + (10 / 4) * (7 * (70 / 10) – 66) = 27.5 Explanation We know that quartiles divide data into four equal groups, and a decile divides data into ten equal parts. Decile gives ranks to a data set from lowest to highest. This is done on a scale of 1 to 10, where each number basically indicates an increase of 10 percentage points. So, 1st decile has 10% of the data points below it, D2 has 20% of the data points below it, and so on. So, decile ranking is another method to categorize data like quartile or percentile. Relevance and Uses of Decile Formula As discussed above, Decile helps us quickly divide the data into ten parts. It eventually makes it easy to understand the data in these parts. In finance, deciles are used to analyze the performance of different funds by ranking them and measuring the performance of one fund against similar funds. For example, you are an analyst and are evaluating a set of mutual funds. So, any fund that is ranked 6 on a decile scale means that it is in the top 60% of the funds. So basically, we can use deciles and can segregate these funds into best and worst-performing funds for a particular period. Recommended Articles This is a guide to the Decile Formula. Here, we discuss how to calculate Deciles along with practical examples and a downloadable Excel template. You may also look at the following articles to learn more – 0 ratings0% found this document useful (0 votes)220 viewsThe document discusses measures of position called deciles. Deciles divide a distribution into ten equal parts, with D1 being the 10th percentile and D9 being the 90th percentile. It provide...AI-enhanced title and descriptionSaveSave MATH-10-QUARTER-4-MODULE-2 For Later0%0% found this document useful, undefined Deciles are another way we can consider location of data, where the data is separated into 10 groups. Just as quartiles correspond to specific percentiles, so do deciles. That is, the first decile is equivalent to the 10th percentile, the 5th decile is equivalent to the 2nd quartile and the 50th percentile. If you are asked to find a specific decile, you are really looking for the corresponding percentile (multiply the decile by 10 to get the equivalent percentile). The 8th decile is equal to the 80th percentile. You can also think of these measures of location like money: 2 quarters (2nd quartile) = 5 dimes (5th decile) = 50 pennies (50th percentile). The decile calculator helps you split a dataset into different deciles and use the decile scale to compare the data. Much like percentage, percentile, and quartile, the decile rank is commonly used in descriptive statistics to divide the data into samples for easier analysis. Using the decile calculation formula, our tool divides the set of observations into 10 samples and allots the decile rank accordingly. The definition of a decile states that it is the set of 9 values that splits the dataset into 10 groups. It is similar to quartiles and percentiles. Deciles are where the data points are ordered from least to greatest and split into 10 groups with an equal range of values in each. This helps us understand what a decile means. As a special case, if there are only 9 data points in the set, each of the 9 values will represent the 9 deciles, and there won't be a 10th group of data. To calculate the decile values, we need at least 9 data points in our dataset. We can find the solution for the decile calculation using the following decile formula: kth decile = [k · (n + 1)10]th data\footnotesize \ k^{\mathrm{th}}\ \mathrm{decile}\ =\ \left[\frac{k\ \cdot\ (n\ +\ 1)}{10}\right]^{\mathrm{th}}\ \mathrm{data} kth decile = [10k · (n + 1)]th datawhere: k = 1, 2, 3, ..., 9; and n – Number of data points. So, for example, if there are 99 data points and we want to know how to calculate decile 1 or the 1st decile, we'll follow these steps: We'd first arrange the values in increasing order to find the decile rank. Use the d1 formula or the formula for the 1st decile: 1st decile = [1 · (99 + 1)10]th data\footnotesize\ 1^{\mathrm{st}}\ \mathrm{decile}\ =\ \left[\frac{1\ \cdot\ (99\ +\ 1)}{10}\right]^{\mathrm{th}}\ \mathrm{data} 1st decile = [101 · (99 + 1)]th data So in the ordered dataset, we get: 1st decile = 10th data\footnotesize\quad\ \ 1^{\mathrm{st}}\ \mathrm{decile}\ =\ 10^{\mathrm{th}}\ \mathrm{data} 1st decile = 10th dataThis way, by using the d1 formula (1st decile formula), we see that for a set of 99 values in the decile scale, the 1st decile will be the 10th value! We can also see that the 1st decile rank is equivalent to the 10th percentile rank! Let's say we have the following 20 values in our dataset:First, we'd arrange them in ascending order to get this:We can estimate the 9 deciles using the formula:kth decile = [k · 2110]th data\quad \footnotesize k^{\mathrm{th}}\ \mathrm{decile}\ =\ \left[\frac{k\ \cdot\ 21}{10}\right]^{\mathrm{th}}\ \mathrm{data}kth decile = [10k · 21]th dataApplying this gives us the following results:If the decile is a fractional or a decimal value, for example, the 2.1th data in the above dataset, then its calculation would be a little different, and unlike a median calculation. We would calculate the 2.1th data point as follows: 2.1 is 0.1 of the distance between 2 and 3, so we will first find the difference between the 2nd and 3rd data points. This will give us -9 - (-40) = 31. We'd then find 0.1 of 31 by multiplying, which would give us 0.1 × 31 = 3.1. 3.1 units from the 2nd data point is -40 + 3.1 = -36.9. Therefore, we get the 1st decile of the above example dataset as the 2.1th data point, which is -36.9! We work with a variety of data in our day-to-day lives and professions. Sometimes, the data that we have may follow a specific kind of distribution, such as: Even beyond identifying the type of data distribution, we may sometimes want to rank the data on a normalized scale such as test or exam scores, and a few such ranking mechanisms that are most used are: Quartiles – to find the top 25% data; Deciles – to find the top 10% data; and Percentiles – to find the top 1% data. The decile definition states that it is a statistical measure that divides a dataset into 10 buckets based on the decile scale. The top decile, for instance, refers to the top (1/10)th of the data values. We can find what the deciles are using the solution to the decile calculation formula. Once we calculate the 9 deciles of the dataset, we can partition the set into 10 segments or ranks.The 90th percentile of a dataset is the same as the 9th decile of the same set. Any values above the 90th percentile or the 9th decile will represent the top (1/10)th of the data values. The 10th decile (if it exists) represents the maximum of all the data values.Quartiles, deciles, and percentiles are statistical measures used to rank a dataset into different numbers of buckets. To know how to calculate quartiles, deciles, and percentiles, we'd use slightly different formulas, but each of those accomplishes the following: Quartiles divide the dataset into 4 ranks; Deciles divide the dataset into 10 ranks; and Percentiles divide the dataset into 100 ranks. For datasets that have 9 values, we'd have only 9 deciles. But for other datasets that have 10 or more values, we will have 10 deciles, where the 10th decile is simply the highest number in the distribution. Let us suppose that John has given a set of unsorted data points. He has asked to sort the numbers and cut them into 10 equal sections. So, help John sort the following 23 random numbers valued from 20 to 78 and present them as decile grouped data. The raw numbers are:24, 32, 27, 32, 23, 62, 45, 77, 60, 63, 36, 54, 57, 36, 72, 55, 51, 32, 56, 33, 42, 55, 30.Given,Firstly, sort the 23 random numbers in the ascending order like below,23, 24, 27, 30, 32, 32, 32, 33, 36, 36, 42, 45, 51, 54, 55, 55, 56, 57, 60, 62, 63, 72, 77So, the calculation can be as follows:Similarly, we can calculate each decile as shown above,Now, D1 = 1 * (n + 1) / 10 th data = 1 * (23 + 1) / 10= 2.4th data i.e. between digit no. 2 and 3which is = 24 + 0.4 * (27 – 24) = 25.2Again, D2 = 2 * (23 + 1) / 10 th data= 4.8th data i.e. between digit no. 4 and 5which is = 30 + 0.8 * (32 – 30) = 31.6Again, D3 = 3 * (23 + 1) / 10 th data= 7.2th data i.e. between digit no. 7 and 8which is = 32 + 0.2 * (33 – 32) = 32.2Again, D4 = 4 * (23 + 1) / 10 th data= 9.6th data i.e. between digit no. 9 and 10which is = 36 + 0.6 * (36 – 36) = 36Again, D5 = 5 * (23 + 1) / 10 th data= 12th data i.e. digit no. 12which is 45Again, D6 = 6 * (23 + 1) / 10 th data= 14.4th data i.e. between digit no. 14 and 15which is = 54 + 0.4 * (55 – 54) = 54.4Again, D7 = 7 * (23 + 1) / 10 th data= 16.8th data i.e. between digit no. 16 and 17which is = 55 + 0.8 * (56 – 55) = 55.8Again, D8 = 8 * (23 + 1) / 10 th data= 19.2th data i.e. between digit no. 19 and 20which is = 60 + 0.2 * (62 – 60) = 60.4Again, D9 = 9 * (23 + 1) / 10 th data= 21.6th data i.e. between digit no. 21 and 22which is = 63 + 0.6 * (72 – 63) = 68.4The decile will be:Therefore, the value is as follows –D1 =25.2