PERCENTILE

A percentile is the value of a variable below which a certain percent of observations fall. So the 20th percentile is the value (or score) below which 20 percent of the observations may be found

The 25th percentile is also known as the first quartile(Q_1); the 50th percentile as the median or second quartile(Q_2); the 75th percentile as the third quartile (Q_3).

How to calculate Percentile

Step 1

Sort the data set ,so that, the measurements are in order from lowest to highest. Normally this is done by entering the numbers in a computer spread sheet and then clicking on the sort command. You can do this manually by listing the possible measurements in order and then making a hash mark beside the appropriate number for each individual measurement.

Step 2

Start to calculate the percentile of an individual measurement (as an example we'll assume this is a test score of 87 out of a possible 100) in a data set of 150. The formula to use is L/N(100) = P where L is the number of measurements less than 87, N is the total number of measurements in the data set (here 150) and P is the percentile. Count up the total number of measurements that are less than 87. We'll assume this total is 113. This gives us L = 113 and N = 150.

Step 3

Divide out L/N to get the decimal equivalent. (113/150 = 0.753). Multiply this by 100 (0.753(100) = 75.3).

Step 4

Discard the digits to the right of the decimal point. For 75.3 this leaves 75. This is the percentile of a measurement of 87 in our example and means this measurement is higher than 75 percent of all the measurements in the data set.

Step 5

Calculate the measurement which is at a given percentile. Let's say you want to know what the median of the data set is (the number for which 50% of the measurements are less and 50% are greater). We use the same variables but a slightly different equation. The formula is (P/100)*N = L. In our example, P = 50 and N = 150 so we have (50/100)*150 = 75.

Step 6

Count the number of measurements starting with the lowest until you get to 75. The next higher measurement (#76) is at the 50th percentile.

Example

Lets consider the mark list of 22 students.
13, 45,36, 78,99,35, 26,73,66, 95,56,76, 84,24,71, 44,34,23, 41,90,81, 21
Note that N= 22

Step 1 – Arrange them in ascending order
13,21,23, 24,26,34, 35,36,41, 44,45,56, 66,71,73, 76,78,81, 84,90,95, 99

Step 2 – Suppose that I want to find the percentile of the mark 44 (say)
Find out the number of marks that falls before 44

13,21,23, 24,26,34, 35,36,41, 44,45,56, 66,71,73, 76,78,81, 84,90,95, 99
There are 9 observations(clear?)
Thus L = 9

Step 3 & 4 - Therefore P= 9/22*100 = 40.9 = 41(apprx) which says that the student who got 44 falls on the 41st percentile.
What does it reveal then?
When the students score is projected over a class of 100 students,then there are 41 students who had scored **less than** this score.

Lets check for score 90
13,21,23, 24,26,34, 35,36,41, 44,45,56, 66,71,73, 76,78,81, 84,90,95, 99
L= 19
P= 19*100/22 = 86.36 which is equal to 86th percentile
Thus when his scored is calculated for the class strength of 100,the number of score falls before him are 86 ie 86 students are expected to get less score than his score(90)

Clear now?

Lets work on Step 5 & 6

Step 5
Suppose if we want to know which mark falls at the 65th percentile,
then L = (P/100)*N
ie L = (65* 22)/100 = 14.3 = 14(approx)

Step 6
Now count 14 terms on the above set or ordered observations
13,21,23, 24,26,34, 35,36,41, 44,45,56, 66,71,73, 76,78,81, 84,90,95, 99

Thus the score 73 stands at the 65th percentile.

Clear?