Railway Recruitment Boards
Ministry of Railways

FAQ on Normalization of Marks

Q. Why examination is conducted in multiple sessions?

A. RRB examinations attract exceptionally large number of candidates. In order to take examination for such a large number of candidates, examination has to be split in various sessions keeping in view the limitations of the capacity of examination venues available across the country. For example, CEN 02.2018 for Level 1 post had attracted 1.89 Crore candidates and the examination was conducted in 153 sessions.

Q. Why normalization is necessary?

A. When an examination is conducted in multiple sessions for the same syllabus, in spite of all efforts there are chances of variation in the difficulty level of the questions in various sessions. Thus the score obtained by the candidates of same calibre is likely to vary. In order to equalize the variation in the difficulty level of question papers a process called statistical normalization of marks is resorted to universally. This ensures level playing field for all the candidates.

Q. RRBs had conducted examinations in multiple sessions in the past also. Were they adopting normalization?

A. Yes. Normalization is being done by RRBs in examinations conducted in multiple sessions since year 2000 onwards.

Q. Is normalization some sort of grace marks?

A. No. Normalization process followed by RRBs is a scientific and statistical process. It is not a process of awarding grace marks.

Q. So can normalization result in reduction as well as increase in the marks as compared to the raw marks?

A. Yes. It completely depends on the statistical parameters calculated based on the performance of candidates in the session of the candidates as well as candidates of other sessions.

Q. This means the performance of candidates is statistically judged based on all the candidates he/she is competing with?

A. Yes. The process involves raw score of the candidate, mean and standard deviation of raw marks of candidates in his/her session as well as other sessions being normalized.

Q. What is Raw Score? How Raw Score is calculated?

A. The Raw Score is computed as under:

Total Questions-100; No of Questions Ignored (question wrong, multiple options correct etc): 2

No of Questions attempted: 60; Correctly Answered: 54; Wrongly Answered: 6

Positive Marks: 54; Negative Marks: 2; Net Score: 54-2=52

Score Out of 100: (52/98)*100= 53.06

Raw Score= 53.06

Q. This means it does not involve human intervention?

A. Yes. It is totally based on calculated values of parameters such as raw score of the candidate, mean and standard deviation of raw marks of candidates in his/her session and mean and standard deviation of raw marks of candidates other sessions.

Q. Can candidates of same session have variations in the increase/decrease in the marks after normalization?

A. Yes. This is because the raw score of different candidates are different and as mentioned earlier, the raw score of candidate is also one of the parameters in the calculation. So increase/decrease of one candidate may differ from increase/decrease of another candidate in the same session. (Please see examples below)

Q. The normalized marks of my competitor has increased as compared to his raw marks but my raw marks and normalized marks are same. Why?

A. In the statistical process, statistical parameters of a session e.g. mean marks and standard deviation of marks scored by the candidates in the session are analysed and based on the calculated values of these parameters a session is taken as base session. The normalization is carried out with respect to this base session so as to equalize the difficulty level of all other sessions to this session. Since it is base session so there is no change in the normalized marks and raw marks of this session. (Please see examples below)

Q. But so many candidates have scored marks higher than 100?

A. Yes. In the normalization process, this is possible in case of very good performers in the difficult session. Consider a candidate who had appeared in the most difficult session and yet scored very high marks say 90. In the process of normalization, the candidates of this session will generally have increase in the marks as we equalise the difficulty level of this session as compared to the base session. So a few high performer in the difficult session, such as this candidate, may get normalized marks over 100 also. (Please see examples below)

Q. Is this the first time that candidates have got normalized scores more than 100?

A. No. In the past RRB examinations also, some candidates had marks more than 100.

Q. Is there any change in the normalization process/formulae for CEN 02/2018?

A. No. The normalization process adopted in the CEN 02/2018 is exactly same as adopted in past several RRB examinations since year 2000.

Q. What is the normalization process adopted in the CEN 02/2018?

A. The normalisation formula used by RRBs is as under:

$$X_n = (S_2/S_1) (X-X_{av}) + Y_{av}$$

Where
X_n= Normalised Score of a Candidate
S_2= Standard Deviation of raw marks of Base Session
S_1= Standard Deviation of raw marks of Candidate Session
X= Raw marks of candidate which is to be normalized
X_{av}= Average of raw marks of Candidate Session

Y_{av}= Average of raw marks of Base Session

Q. How Base Session is decided?

A. Among sessions having 70% and above the average attendance of all sessions, the one with maximum value of Mean of raw score is taken as base session.

Q. Can you give some examples to illustrate the process?

A. Consider In examination which is conducted in 9 sessions and the statistical parameters of the sessions are as under:

Session No	Mean of Raw Mark	Standard Deviation of Raw Marks
1	29.28	16.33
2	26.62	14.75
3	26.45	16.37
4	25.94	15.16
5	27.37	15.18
6	32.05	15.82
7	38.32	18.32
8	21.31	12.68
9	33.02	17.61

Session No 7 is taken as base session based on the mean of raw marks.

Example 1: Consider a candidate of **Session 8**, whose **raw marks are 75**.

So here S2= 18.32, S1= 12.68, X_{av}= 21.31, Y_{av}= 38.32, X= 75

Applying the formula above the normalized marks would be:

X_n = (S_2/S_1) $(X-X_{av})$ + Y_{av}
= (18.32/12.68)(75-21.31)+38.32

= 115.89

Example 2: Taking another example of a candidate of **Session 8**, whose **raw marks is 35**.

So here S2= 18.32, S1= 12.68, X_{av}= 21.31, Y_{av}= 38.32, X= 35

Applying the formula above the normalized marks would be:

X_n = (S_2/S_1) $(X-X_{av})$ + Y_{av}
= (18.32/12.68)(35-21.31)+38.32

= 58.09

Example 3: Consider a candidate of **Session 9** whose **raw marks are 35**

So here S2= 18.32, S1= 17.61, X_{av}= 33.02, Y_{av}= 38.32, X= 35

Applying the formula above the normalized marks would be:

X_n = (S_2/S_1) $(X-X_{av})$ + Y_{av}
= (18.32/17.61)(35-33.02)+38.32

= 40.37

Example 4: Consider a candidate of **Session 7** whose **raw marks are 40**

So here S2= 18.32, S1= 18.32, X_{av}= 38.32, Y_{av}= 38.32, X= 40

Applying the formula above the normalized marks would be:

X_n = (S_2/S_1) $(X-X_{av})$ + Y_{av}
= (18.32/18.32)(40-38.32)+38.32

= 40 (i.e. No change)

Example 5: Consider a candidate of **Session 9** whose **raw marks are 23**

So here S2= 18.32, S1= 17.61, X_{av}= 33.02, Y_{av}= 38.32, X= 23

Applying the formula above the normalized marks would be:

X_n = (S_2/S_1) $(X-X_{av})$ + Y_{av}
= (18.32/17.61)(23-33.02)+38.32

= 27.89

Example 6: Consider a candidate of **Session 10** whose **raw marks are 23**

So here S2= 18.32, S1= 17.61, X_{av}= 33.02, Y_{av}= 38.32, X= 23

Applying the formula above the normalized marks would be:

X_n = (S_2/S_1) $(X-X_{av})$ + Y_{av}
= (18.32/17.61)(23-33.02)+38.32

= 27.89

Q. Can normalized score be less than raw score?

Yes, it can be in certain cases. For example, if SD and Mean of Base Session is 18.80 and 42.28 respectively, and the SD and Mean of candidate's session is 19.9 and 41.62; for a raw score of 75, the normalized score would be

=(18.80/19.9)(75-41.62)+42.28= 73.81

Q. That means the normalization process is completely statistical/mathematical and there is no discretion/human intervention whatsoever?

A. Absolutely.