

# Appendix A. Glossary

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## Average (Mean) Score

The average is the arithmetic mean of a set of scores. It is used in every report except the Item Analysis Report.

## Batch

A set of forms scanned in for a single Test ID. A batch consists of a Header Sheet, one or more Key Sheets, and a set of student answer sheets. The test data scanned in for a single batch will be sent to a data set. Refer to Section 3, **Test Preparation, Step 5. Arrange and Scan a Batch** for a description of the different possible arrangement of forms.

## Data Set

A examSYSTEM II file-like structure containing test data that has been scanned in or imported. One or more data sets comprise a folder in the examSYSTEM II data hierarchy.

## Delimited Variable Length File

One of the file types that examSYSTEM II software can export. This is a standard ASCII text file with each field separated by a comma or a tab character. Unused trailing characters in each field are deleted. You can select comma-delimited or tab-delimited file type on the Export Test Data Screen.

For details of file format output, see Appendix B, Export File Format.

## Difficulty Factor

The difficulty factor of a question is the proportion of respondents selecting the right answer to that question. It is used in the Item Analysis Report. The difficulty factor is calculated using the following formula.

$$D = c / n$$

- D** - Difficulty factor
- c** - Number of correct answers
- n** - Number of respondents

## Discrimination Index

The discrimination index measures the extent to which item responses can discriminate between individuals who attain a high score on the test and those who attain a low score. This is calculated for each response alternative. The discrimination index is used in the Item Analysis Report. This value is calculated using the following formula.

$$DI = (a - b) / n$$

- DI** - Discrimination Index
- a** - Response frequency of the upper quartile
- b** - Response frequency of the lower quartile
- n** - Number of respondents in the upper quartile

## Export

An examSYSTEM II data management feature that lets you create an ASCII file containing student test score information from an examSYSTEM II test data set. Depending on the export format you select, the ASCII file can be used as input to NCS InteGrade® Pro gradebook or to any other gradebook program that accepts imported ASCII score files, or to spreadsheet or database software packages for additional statistical analysis and reporting.

## Formula Scoring

Formula scoring is intended to discourage guessing on tests. If formula scoring is selected, it is calculated using the following formula.

$$R = c - (i/f)$$

**R** – Raw score

**c** – Number of correct answers

**i** – Number of incorrect answers (does NOT include answers left blank)

**f** – Formula scoring factor (selected on the Test Header). Normally, the factor should be one less than the number of possible answers to each question. For example, if each question has 5 choices, the factor should be 4. Scoring will deduct 1/4 of a point for each wrong answer.

**Example:** In a test with 50 questions, there are 5 choices for the answer to each question. The scoring factor is 4 (5-1). Assume 45 questions were answered, 5 left blank. Of the 45 answered, 40 were correct and 7 were incorrect. The score without formula scoring is 40. The total score calculated using formula scoring is:

$$40 - (7 + 4) = 38.25$$

Because of rounding, the adjusted raw score is 38.

## Import

An examSYSTEM II data management feature that lets you create a test data set from a data file created from Image ScanTools software using the 5000i scanner. The import file has an extension of .dat. ExamSYSTEM II treats the Header, Key, and Answer Sheet records in the import file the same as if they were scanned in forms.

## InteGrade Pro Software

An NCS gradebook software program used primarily by educators. It provides a complete list of a student's scores, missing assignments, and up-to-the-minute calculated grades. It offers the class roster, missing tasks, and spreadsheet built-in reports, each able to be customized, they are:

- Class Roster
- Missing Tasks
- Spreadsheet
- Student Demographics

- Student Progress

NCS examSYSTEM II software lets you export examSYSTEM II data into a format that can be imported into InteGrade Pro. For details of file format output, see Appendix B, **Export File Formats**.

## Key Sheet

A form that has been filled out that contains the correct answers to a test. There can be multiple key sheets for a test, one key sheet per subtest. Generally, all key sheets for a test must follow a test header sheet, and precede the student answer sheets. For details, see Section 3, Test Preparation.

## Kuder Richardson 20

This test reliability statistic measures inter-item consistency. A higher Kuder Richardson 20 value indicates a strong relationship between items on the test. A lower value indicates a weaker relationship between test items. This is a more accurate measure than the Kuder Richardson 21 statistic. The Kuder Richardson 20 value is used on the Item Analysis Report. This value is calculated using the following formula.

$$KR = \frac{N}{N-1} * \frac{V - \sum_{i=1}^n p_i q_i}{V}$$

**KR** – Kuder Richardson 20

**N** – Number of items in the test

**V** – Variance of raw scores or standard deviation squared (see *Standard Deviation*)

**p<sub>i</sub>** – Proportion of correct answers of item *i* (correct answers / number of answers)

**q<sub>i</sub>** – Proportion of incorrect answers of item *i* (incorrect answers – *p*)

## Kuder Richardson 21

This test reliability statistic provides a rough approximation of inter-item consistency. A higher Kuder Richardson 21 value indicates a strong relationship between items on the test. A lower value indicates a weaker relationship between test items. The Kuder Richardson 21 value is used on the Item Analysis Report. This value is calculated using the following formula.

$$KR = \frac{N}{N-1} * \frac{1 - [M(N - M)]}{N * V}$$

**KR** – Kuder Richardson 21.

**N** – Number of items in the test.

**M** – Arithmetic mean of the test scores.

**V** – Variance of the raw scores or the standard deviation squared (see *Standard Deviation*)

## Local Percentile

The local percentile of a raw score shows a student's percentile ranking within the local test population. A high local percentile indicates a test score that is high compared to the test scores of the other respondents. Local percentile is used in these reports: Individual Test Results, Relative Frequency Distribution, Absolute Frequency Distribution, and Test Score Distribution. This value is calculated using the following formula:

$$L = ((0.5 * a) + b) / n$$

- L** - Local percentile
- a** - Frequency of raw score
- b** - Frequency of scores lower than the raw score
- n** - Number of respondents

## Mastery

Mastery is achieving a pre-defined score that demonstrates adequate/appropriate understanding of a subject. For example, on a 10-question test, a score of 8 is required for mastery to occur. The person administering the test defines what is the appropriate mastery score.

Mastery is defined in the Identification # grid on the key sheet. See Section 3, **Step 4. Complete the Key Sheet(s).**

Mastery is reported on the Individual Test Results Report.

## Median Score

The median is the middle score in a set of scores. If there are an even number of scores, the mean value of the two closest to the middle is considered the median score. The median score is part of every report except the Item Analysis Report.

For example, the 7 respondents of a 10-question test received the following scores: 10, 10, 9, 8, 6, 3, and 2. The median score is 8, the middle score of the seven scores.

## Raw Score

The raw score is the total number of correct responses.

In order to calculate the correct response for each question, the key sheet is used to define what is correct. The correct answer can be indicated in one of the following ways for a question on a key sheet:

- Only one response is marked – this mark is the only correct answer. Any answer other than the one marked is considered incorrect, including no response (blank, nothing filled in) is considered incorrect.
- All responses are marked – any response marked for this question is acceptable and considered correct. No response marked (blank, nothing filled in) is considered incorrect.
- No response is marked – the question is ignored, the answer is not marked correct or incorrect, and is not used to calculate the respondent's raw score.

## SDF – Fixed Length Record format

One of the file types that examSYSTEM II software can export. This is a standard ASCII text file with each field filled to the maximum character count. Unused trailing characters are filled with blank spaces.

## Standard Deviation

The standard deviation value is calculated using the following formula.

$$\sqrt{\left(\frac{\sum(a-b)^2}{n-1}\right)}$$

The standard deviation is part of every report except the Item Analysis Report.

- a** – Score for the nth respondent
- b** – Mean (average) score
- n** – Number of respondents

## Stanine

A stanine is a standard score on a scale of 1 to 9. The stanine scale has a mean of 5 and a standard deviation of 2. The stanine is part of the Test Score Distribution Report. Each stanine corresponds to the following range of percentiles:

<u>Stanine</u>	<u>Percentile</u>
9	97-100
8	90-96
7	78-89
6	61-77
5	40-60
4	23-39
3	11-22
2	4-10
1	0-3

## Subtest

A subset of a test. A test can be divided into subtests so that individuals parts of an overall test can be individually reported. For example, a math test can be divided into three subtests: Algebra, Trigonometry, and Geometry. In a multiple subtest setup, a Key Sheet for each subtest must follow the Test Header.

On the Header Sheet, you can specify between zero (0) and ten (10) subtests.

## T-Score

The T-score describes a score that falls within a normal distribution with a mean of 50 and a standard deviation of 10. The T-score may be positive (+) or negative (-). T-score is part of the Test Score Distribution Report. It is calculated as follows:

$$T = (Z * 10) + 50$$

**T** - T-score

**Z** - Z-score

## **Z-Score**

The Z-score describes a score that falls within a normal distribution with a mean of zero and a standard deviation of 1. The Z-score may be positive (+) or negative (-). Z-score is part of the Test Score Distribution Report. It is calculated as follows:

$$Z = (a - b) / c$$

**Z** - Z-score

**a** - Raw score

**b** - Mean raw score

**c** - Standard deviation