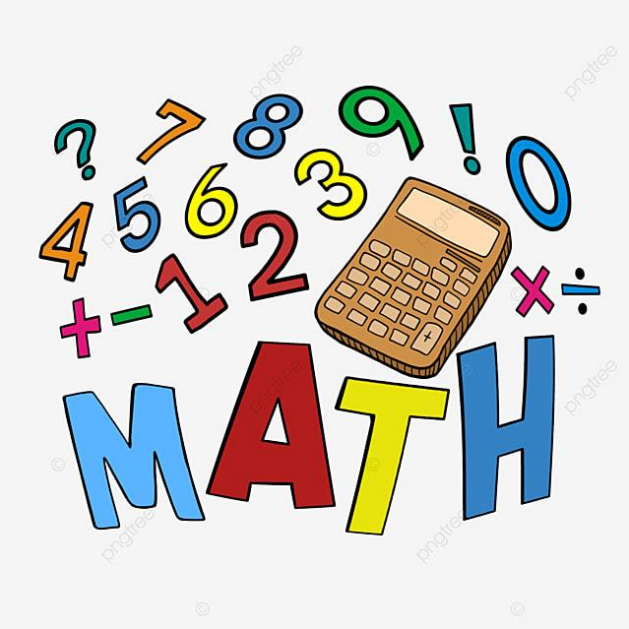
KeyMath3 CDN

PRESENTED BY BESART & AYESHA

OUTLINE

- DESCRIPTION OF KEYMATH3
- PURPOSE OF THE MEASURE
- MAJOR FEATURES
- HOW TO ADMINISTER
- SCORING
- INTERPRETATION
- STRENGTHS/LIMITATIONS



Description

- MEASURES ESSENTIAL MATHEMATICS CONCEPTS AND SKILLS
- COVERS EARLY EXPERIENCES THROUGH ROTE AND RATIONAL COUNTING TO FACTORING POLYNOMIALS AND LINEAR EQUATIONS
- CAN BE USED FOR THOSE BETWEEN 4 YEARS AND 6 MONTHS TO 21 YEARS AND 0 MONTHS

Description

- QUALIFICATION LEVEL B
- AVAILABLE IN FRENCH
- KIT PRICES RANGE
  - Form A or B Complete Kit (Print): $**785.40 CDN**
  - Forms A & B Complete Kit (Print): $**1,421.00 CDN**
  - Form A and B, KeyMath-3 Essential Resources Level I and ASSIST-Software: $**2,261.00 CDN**
  - Form A and B, KeyMath-3 Essential Resources Levels I and II, and ASSIST-Software: **$2,800.75 CDN**

Contents of the Kit (Form A)

- Includes: manual, two free-standing easels for either Form A or Form B, and 25 record forms with detachable Written Computation Examinee Booklet
- 372 items divided into 10 subtests
- Students are required to identify missing elements in a problem, operations needed to solve a problem, and optimal strategies for solving the problem.
- Update from previous versions to include extension upon factoring and solving algebraic expressions

Description of the Manual

Chapters

1: Intro to KeyMath-3
2: Administration and Scoring
3: Interpretation
4: Canadian Standardization

Appendices

A: Form A Tables
B: Form B Tables
C: Diagnostic Profile
D: Participants and Contributors
E: Subtest Topic Descriptions
F: Behavioural Observations
G: NTCM process standards
H: Development (American Edition)
I: Reliability
J: Validity

Easel 1

Numeration

- Measures understanding of whole and rational numbers

Algebra

- Measures understanding of pre-algebra and algebra

Geometry

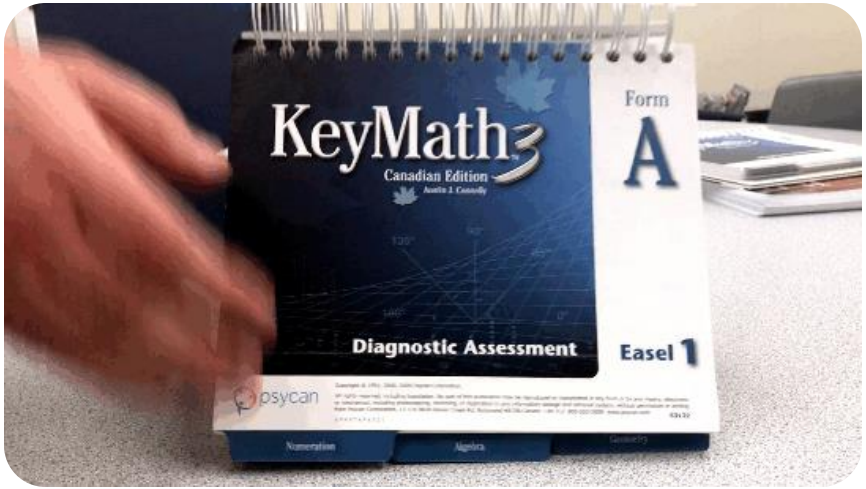
- Measures ability to analyse, describe, compare, and classify 2D and 3D shapes

Measurement

- Measures capability to make comparisons of objects based on a series of attributes

Data Analysis & Probability

- Measures the ability to collect, display, and interpret data as well as knowledge of chance and probability



Easel 2

Mental Computation & Estimation

- Measures ability to mentally compute answers of math problems.

Written Computation (Addition & Subtraction, Multiplication & Division)

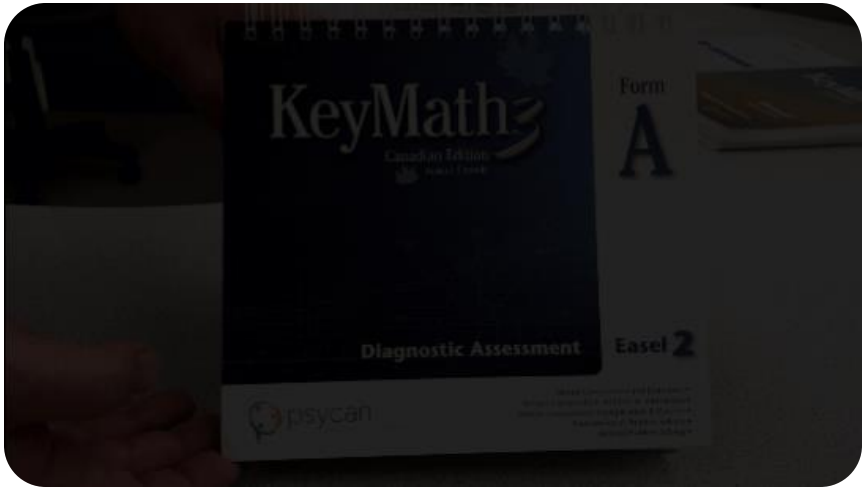
- Measures ability to solve written mathematics problems.

Foundations of Problem Solving

- Measures ability to find components, appropriate operations, and strategies to solve math problems.

Applied Problem Solving

- Measures skills of applied problem interpretation to produce a solution.



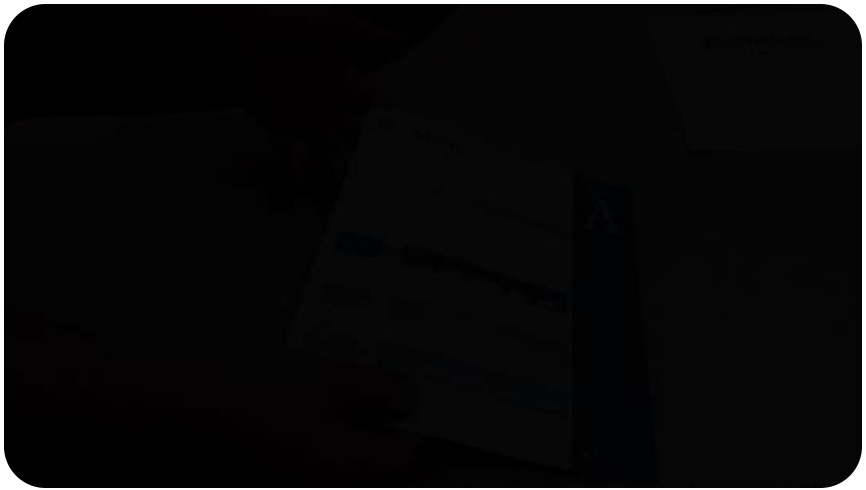
Other Pieces

Record Form A

- Used for scoring

Examinee Booklet

- Used for the Written Computation subtest



Purpose / Recommended Use

1. To measure a student's math proficiency / skill level

2. To measure a student's progress post-assessment

3. To support intervention and future instruction for the assessed student

4. To assist with the student's placement based on their grade-level of functioning

KeyMath3^{CDN} Major Features Explained

Comprehensive measurement of student's math proficiency / skill level

- Covers all essential concepts and skills required to succeed in math (NCTM standards)
- Assesses all essential math concepts and skills as per curriculum (Canadian)
- Subtests can be individually administered

Progress monitoring post-assessment

- Re-assessment every 3 months
- Progress report provided
- Growth scale value (GSV) provides feedback on student progress

KeyMath3^{CDN} Major Features Explained

Algebra concepts included in each level

- Concepts related to algebra are investigated throughout

Informs development of individualized instruction

- Detailed information provided regarding student's abilities in math
- Assessment results inform the individualized instructional plan

Assists with placement based on student's grade-level of functioning

- Performance relative to grade-level peers in math skills informs the educational plan of the student

KeyMath3^{CDN} DA - Administration

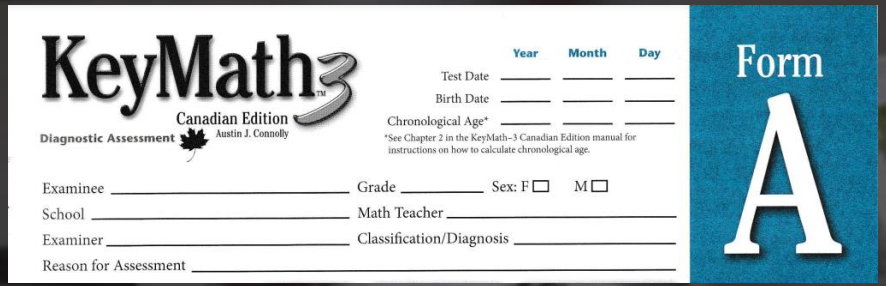
- Qualification to administer: Level B
- Assessment is untimed
  - Questions increase in difficulty
  - 30 - 40 minutes for lower elementary
  - 75 - 90 minutes for older students

Estimated Administration Time (in Minutes), by Area and Grade

Grade	Basic Concepts	Operations	Applications
K	15–20	0–5	5–10
1	20–25	5–10	10–15
2	30–35	5–10	10–15
3	35–40	10–15	15–20
4	40–45	10–15	15–20
5	40–45	15–20	15–20
6	40–45	15–20	15–20
7	40–45	15–20	15–20
8	40–45	20–25	15–20
9–12+	40–45	20–25	15–20

KeyMath3^{CDN} DA - Administration

- Start by completing the student information


KeyMath3
Canadian Edition
Diagnostic Assessment
Austin J. Connolly

Year Month Day

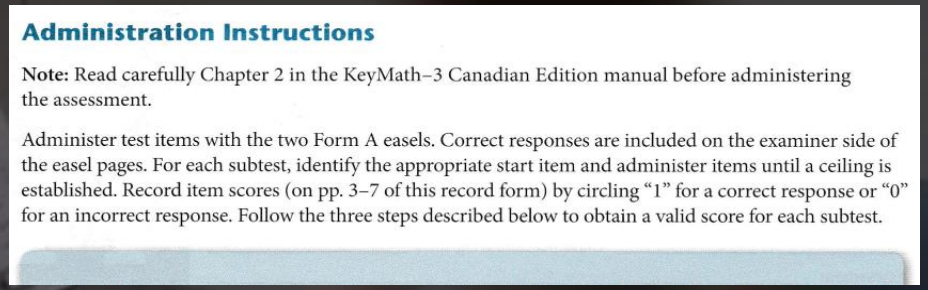
Test Date
Birth Date
Chronological Age*

*See Chapter 2 in the KeyMath–3 Canadian Edition manual for instructions on how to calculate chronological age.

Examinee _____ Grade _____ Sex: F ☐ M ☐
School _____ Math Teacher _____
Examiner _____ Classification/Diagnosis _____
Reason for Assessment _____

Form A

- Review the administration instructions on page 2 of the form


Administration Instructions

Note: Read carefully Chapter 2 in the KeyMath–3 Canadian Edition manual before administering the assessment.

Administer test items with the two Form A easels. Correct responses are included on the examiner side of the easel pages. For each subtest, identify the appropriate start item and administer items until a ceiling is established. Record item scores (on pp. 3–7 of this record form) by circling "1" for a correct response or "0" for an incorrect response. Follow the three steps described below to obtain a valid score for each subtest.

Start point	Basal	Ceiling
• Grade point in Numeration • Ceiling at Numeration as starting point in the other subtests	• First three **items correct**	• Four **items incorrect**

KeyMath3CDN DA - Administration

- Recommended seating and materials arrangement
  - Examiner can see both sides of the easel
  - Easel shields the Record Form

KeyMath3^{CDN} DA - Administration

- Become familiar with the testing materials (Easel 1, Easel 2, WC Booklet)

Basic Concepts	Operations	Application
• Numeration • Algebra • Geometry • Measurement • Data Analysis and Probability	• Mental Computation and Estimation • Addition and Subtraction • Multiplication and Division	• Foundations of Problem Solving • Applied Problem Solving

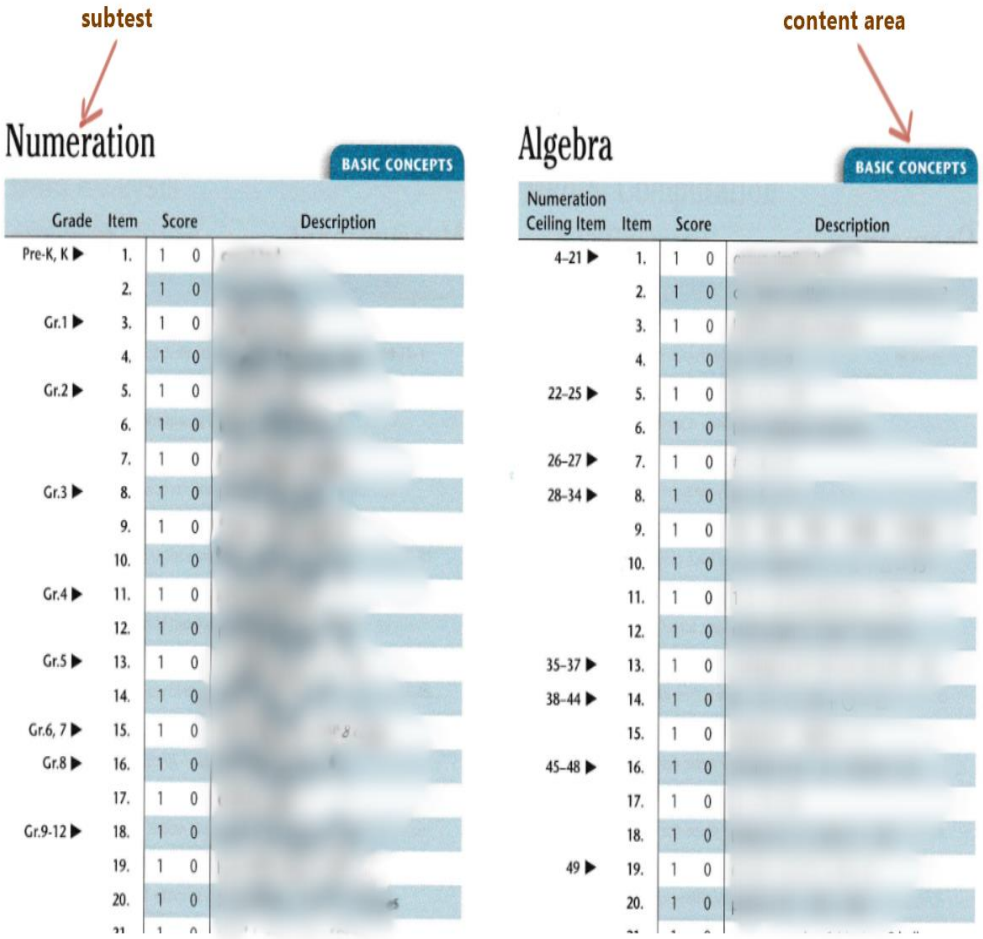
Subtest	Easel 1	Easel 2	WC booklet
Numeration	●		
Algebra	●		
Geometry	●		
Measurement	●		
Data Analysis and Probability	●		
Mental Computation and Estimation		●	
Addition and Subtraction			●
Multiplication and Division			●
Foundations of Problem Solving		●	
Applied Problem Solving		●	

Note: The use of a calculator is permitted for the Applied Problem Solving subtest only.
WC = written computation.

- Determine the numeration ceiling item (demonstration)

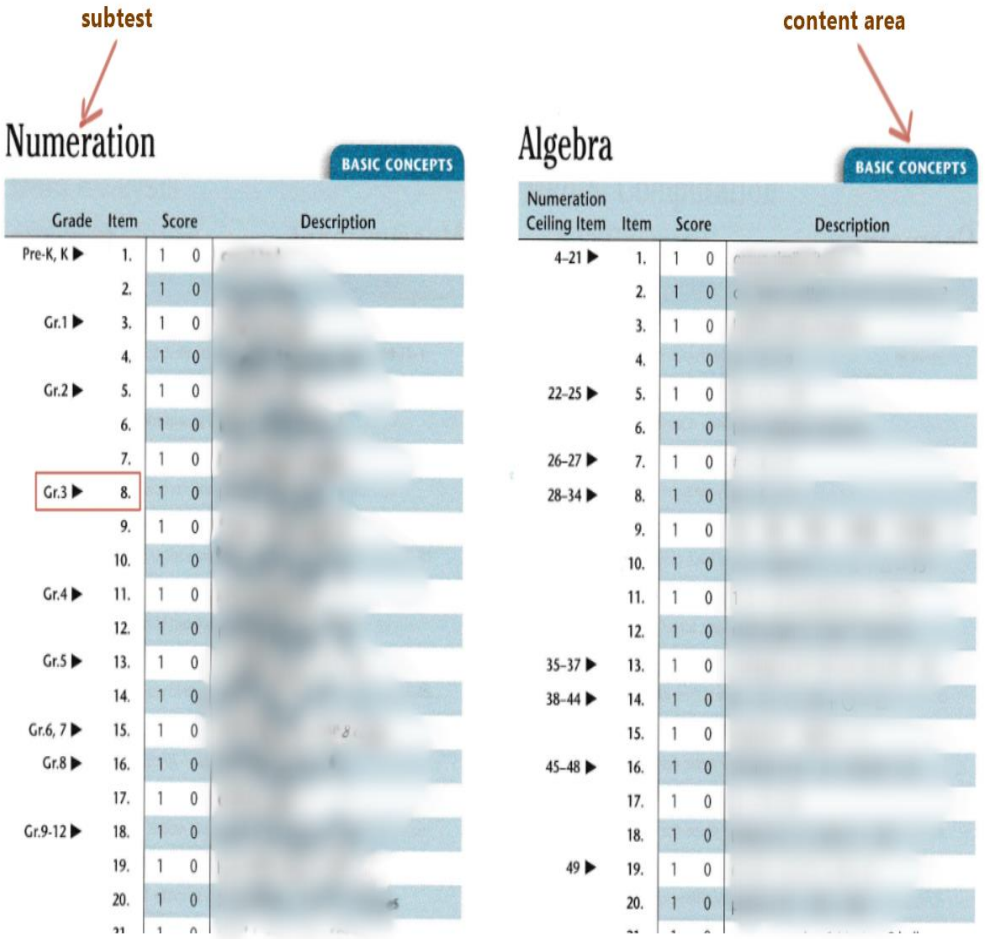
KeyMath3^{CDN} DA Scoring

Starting Points



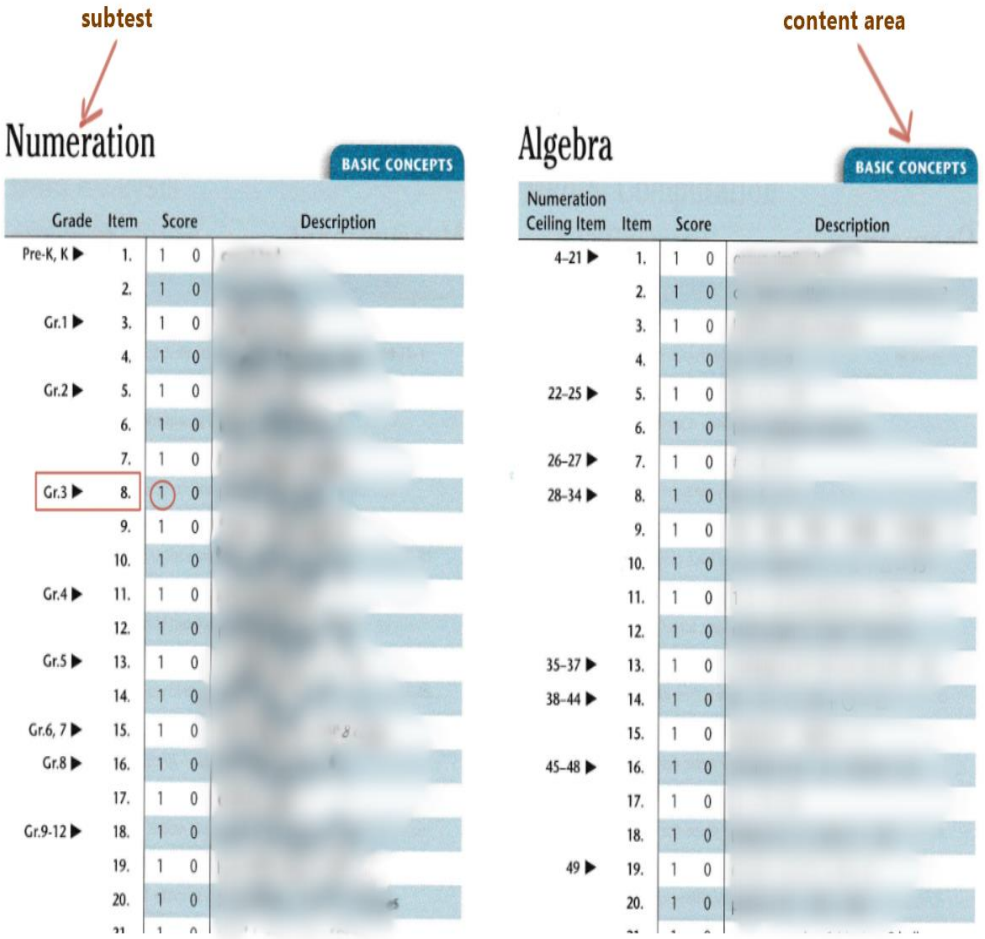
KeyMath3^{CDN} DA Scoring

Starting Points



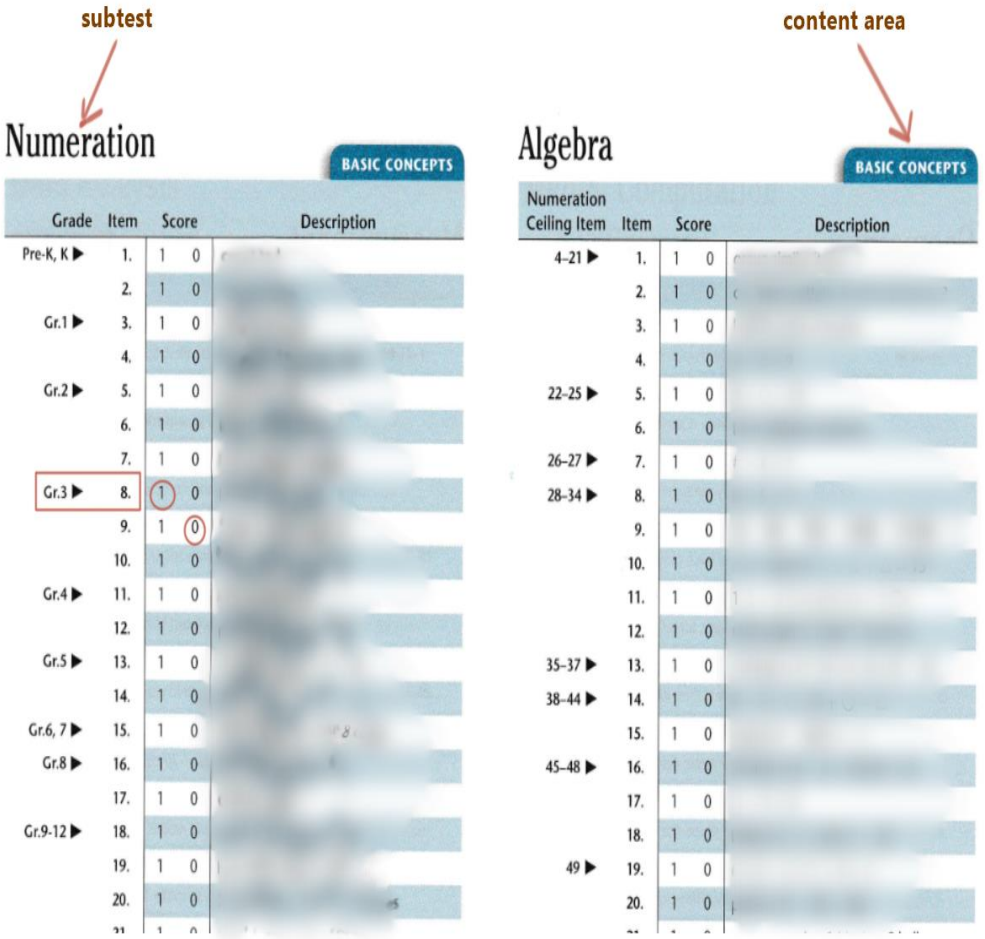
KeyMath3^{CDN} DA Scoring

Starting Points



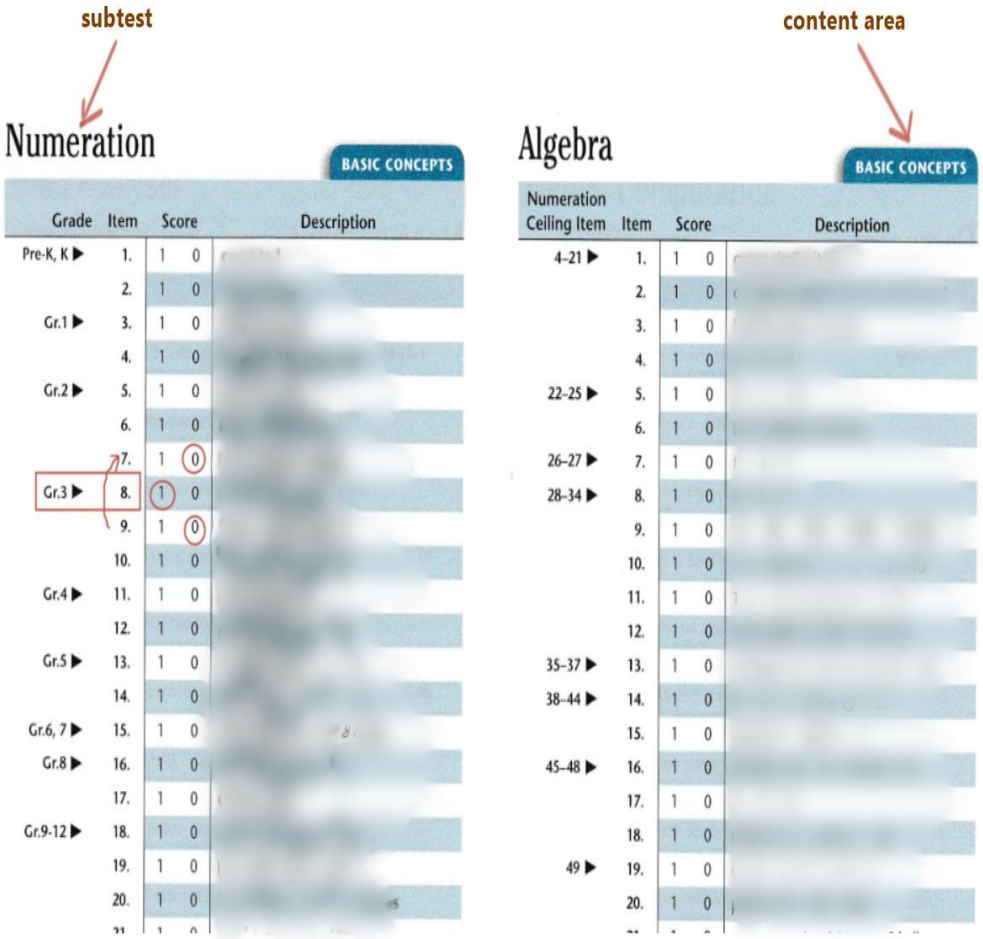
KeyMath3^{CDN} DA Scoring

Starting Points



KeyMath3^{CDN} DA Scoring

Starting Points



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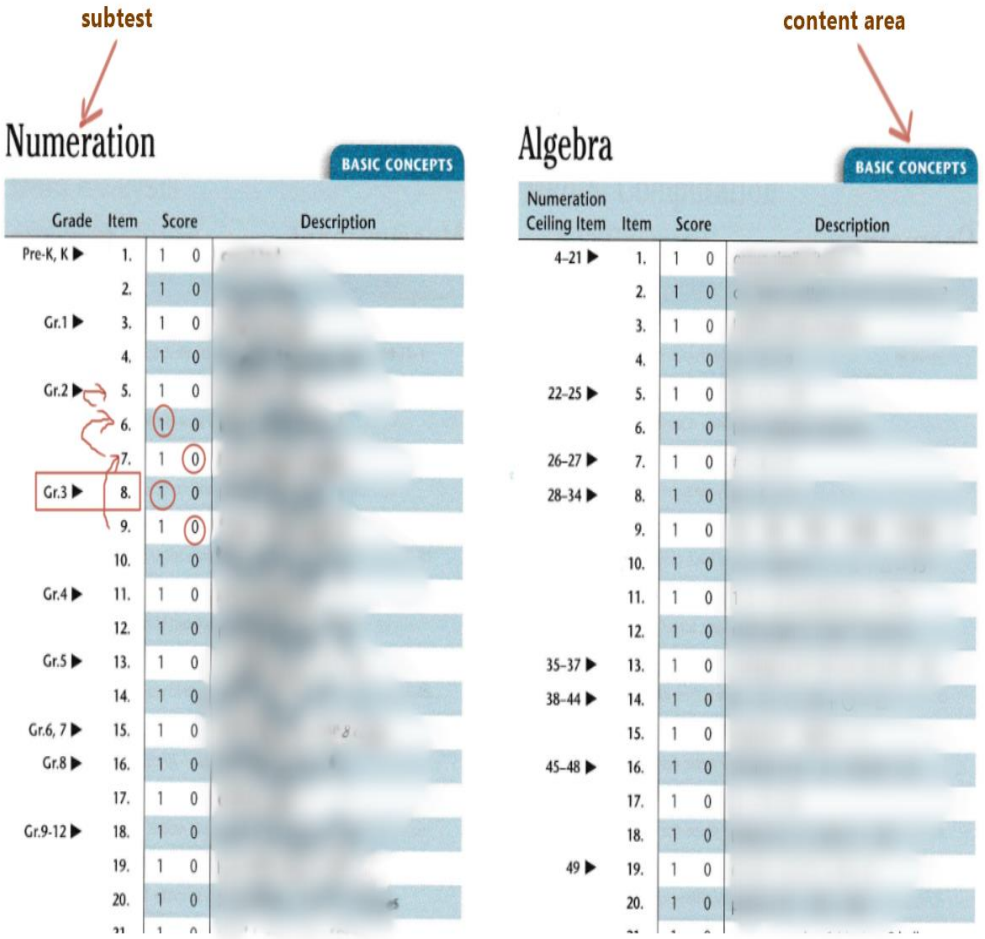

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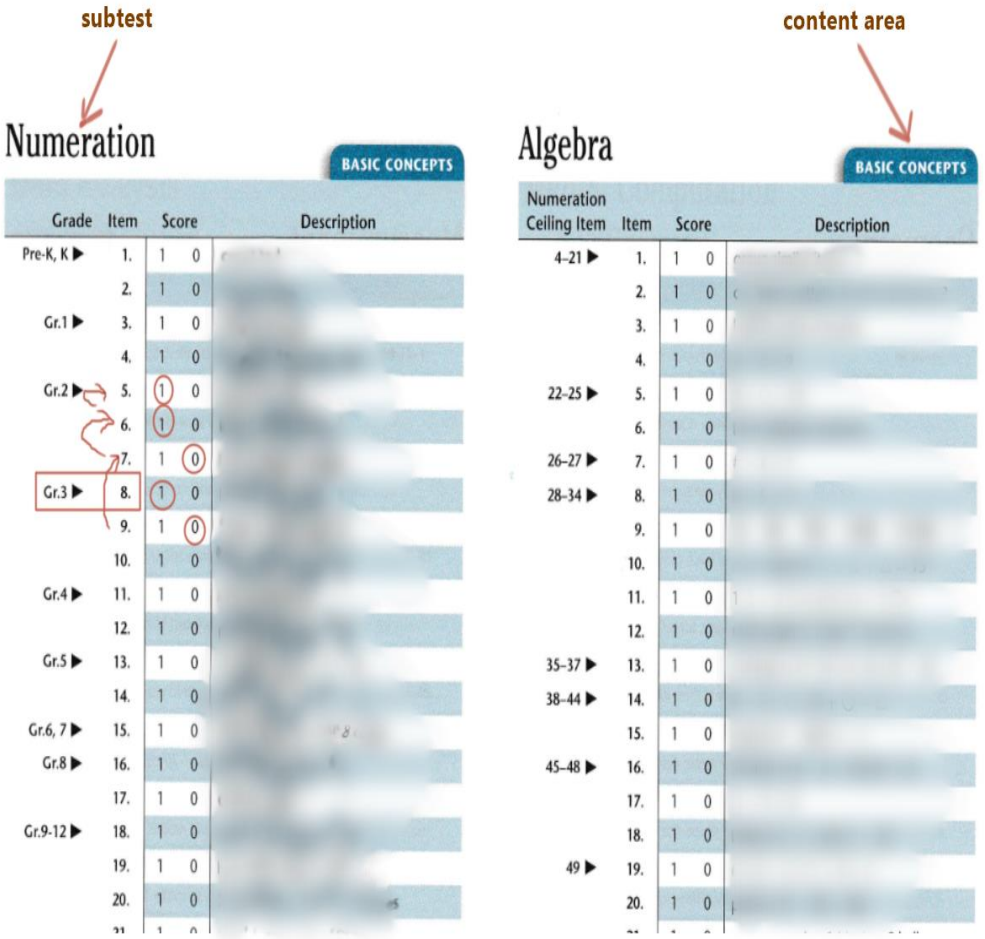

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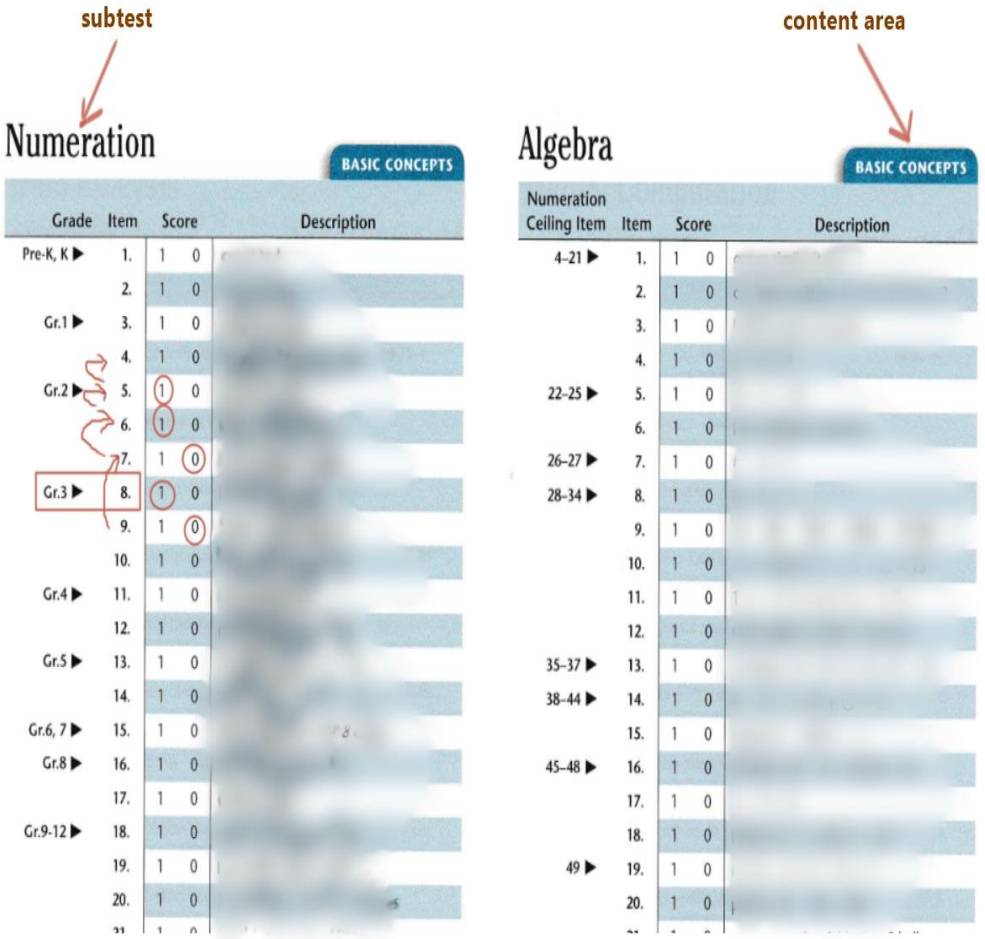

KeyMath3^{CDN} DA Scoring

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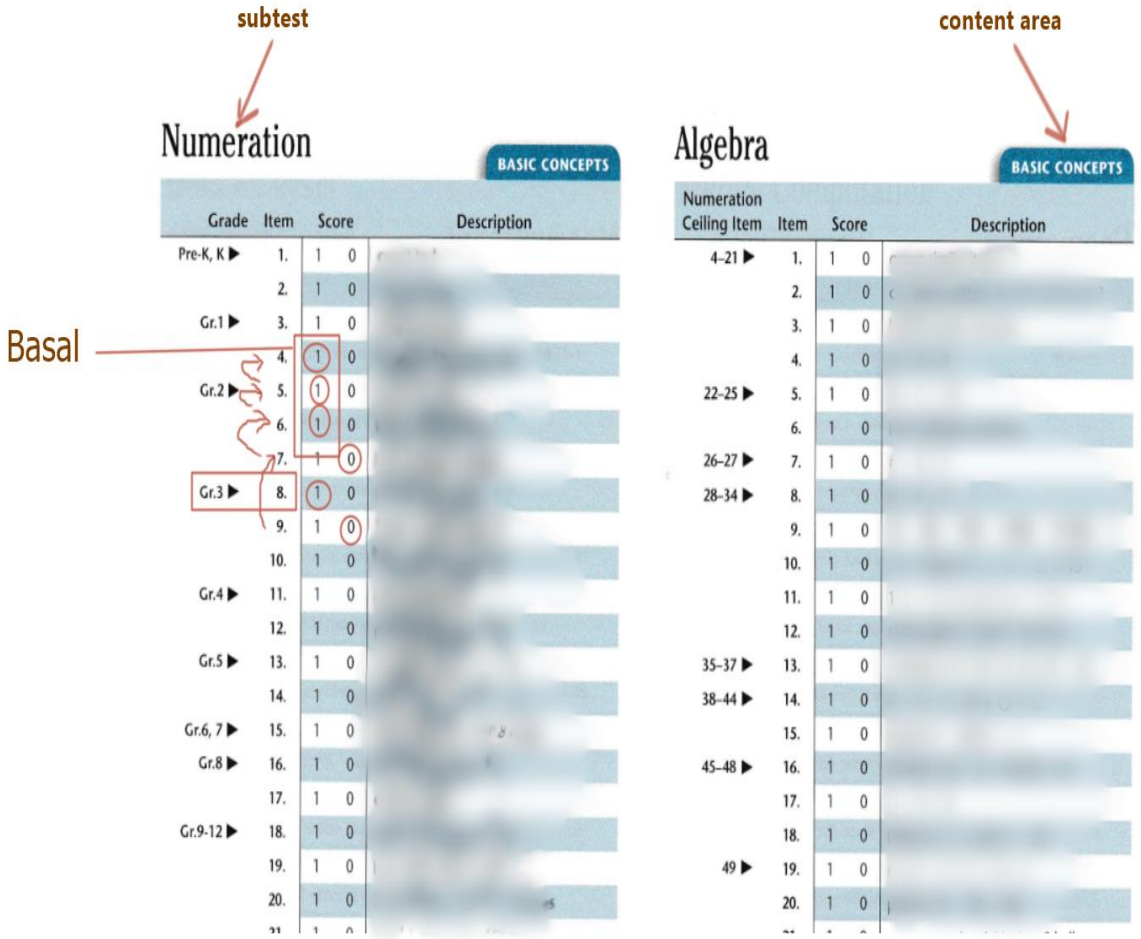

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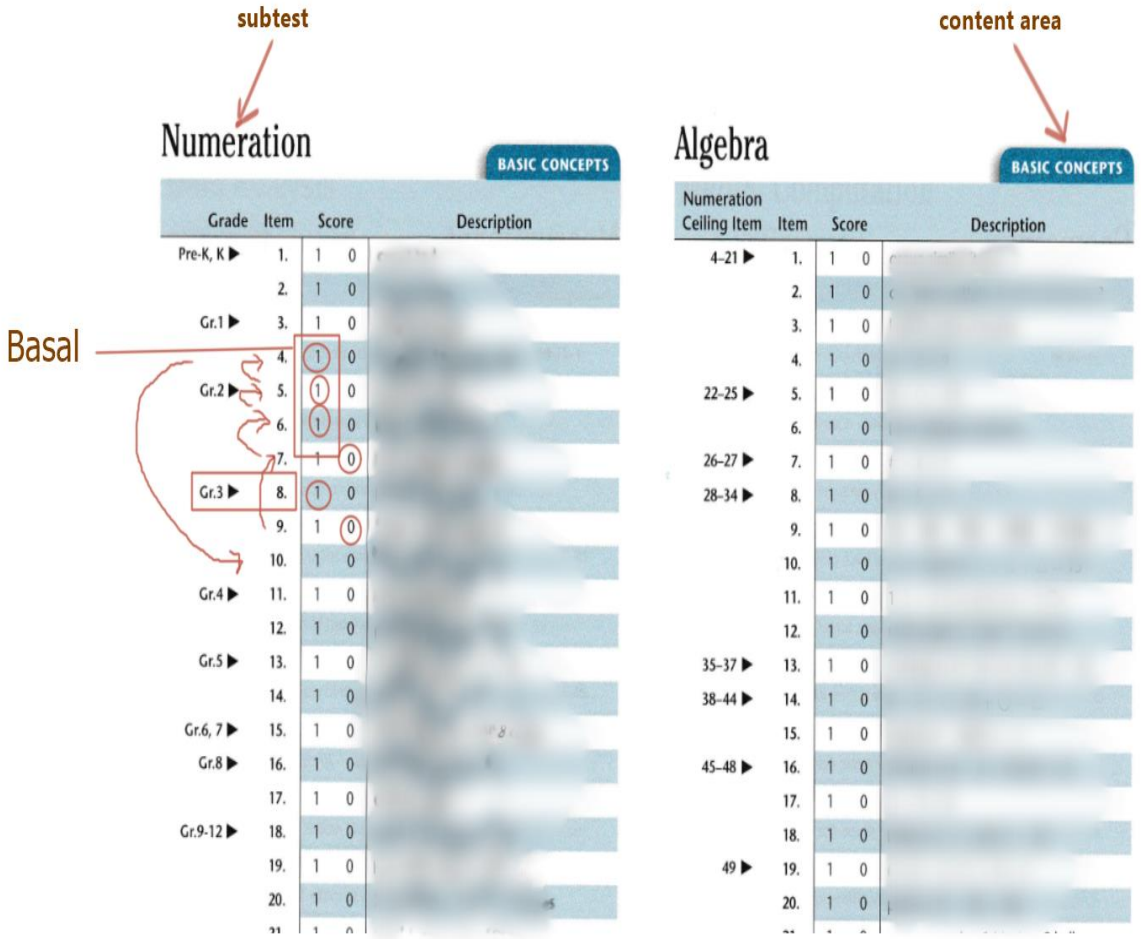
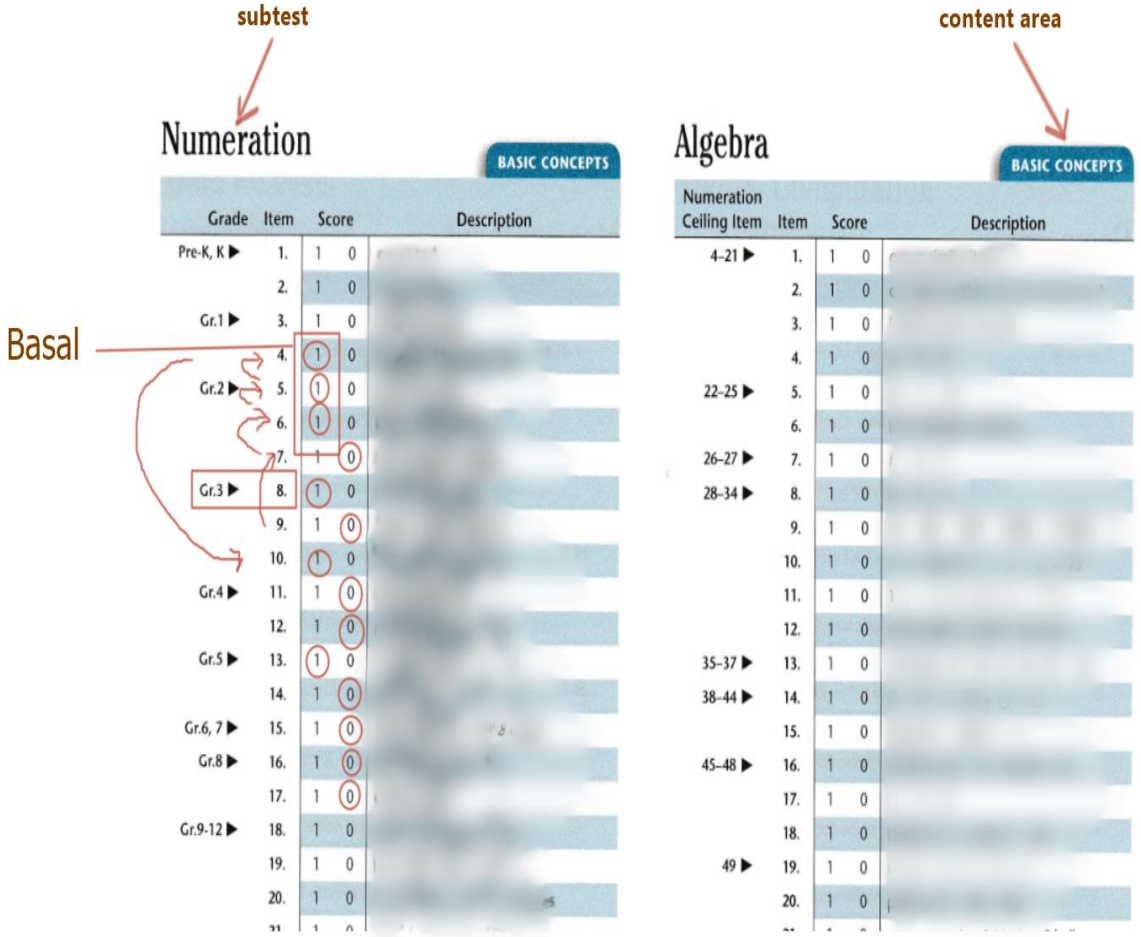


KeyMath3^{CDN} DA Scoring

Starting Points



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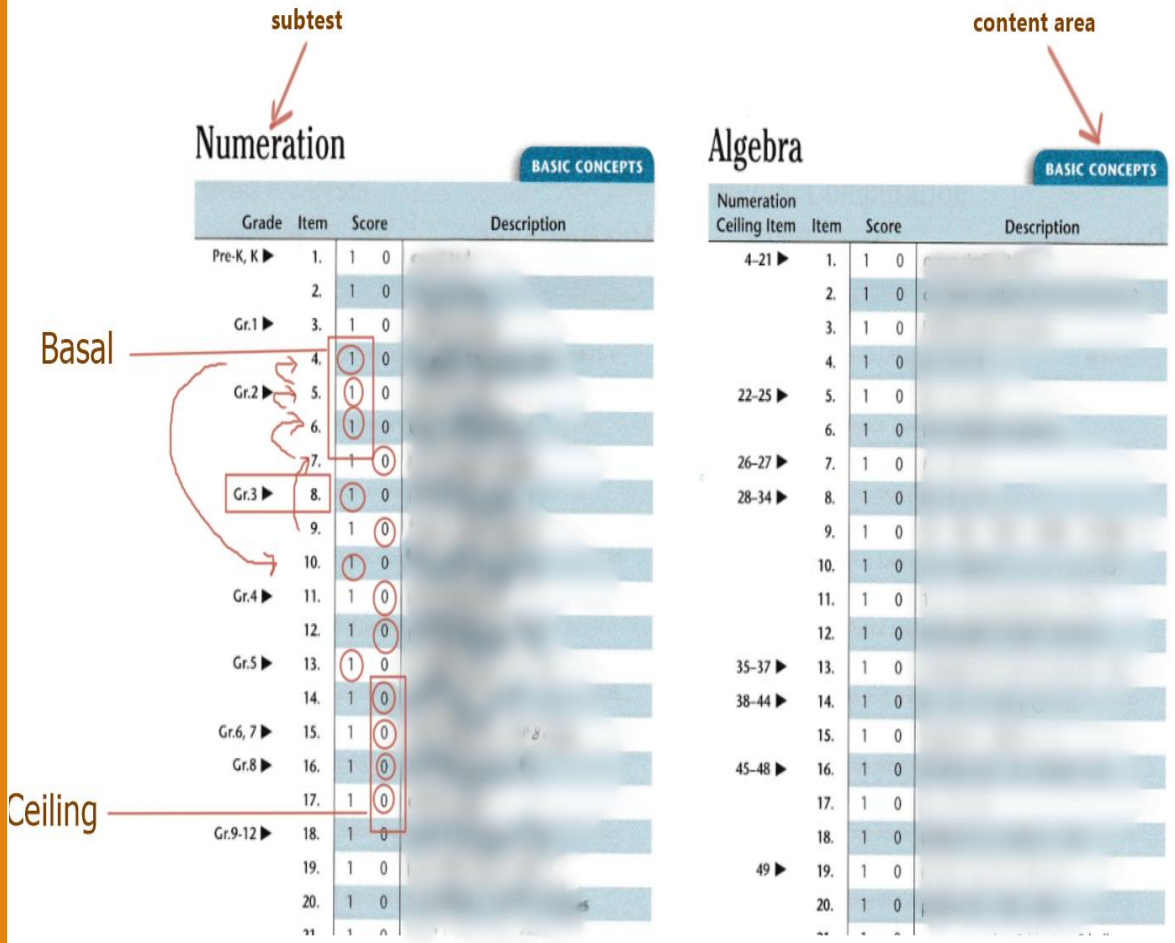
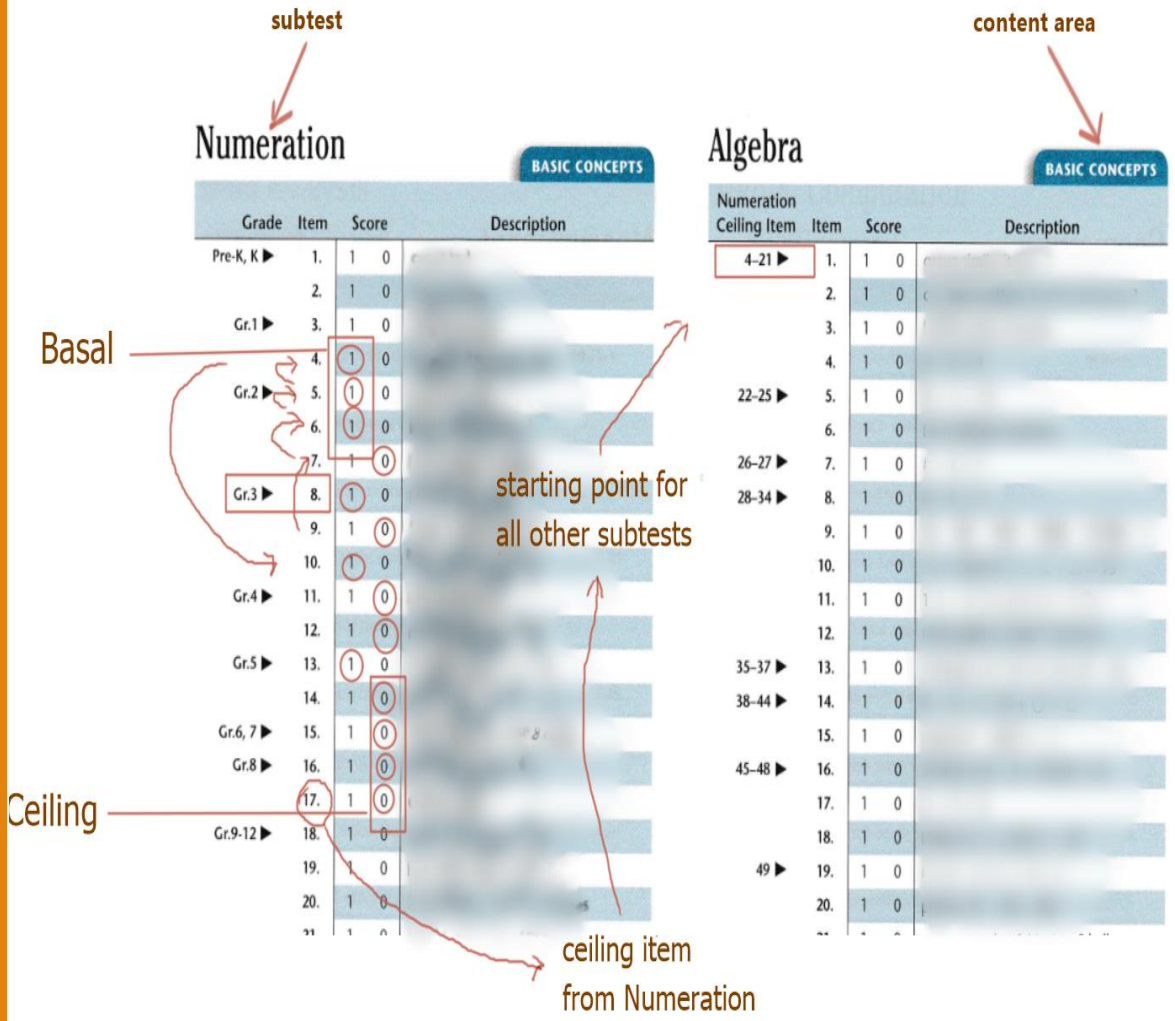


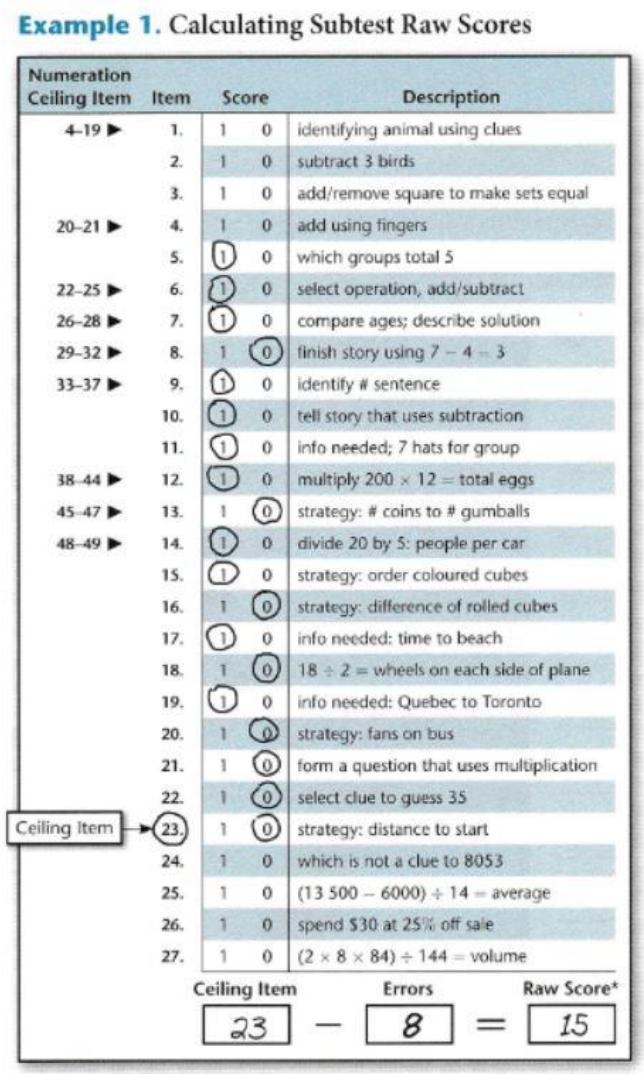
KeyMath3^{CDN} DA Scoring

Starting Points



KeyMath3^{CDN} DA Administration

Calculating Subtest Raw Score



Example 1. Calculating Subtest Raw Scores

Numeration Ceiling Item	Item	Score		Description
4–19 ▶	1.	1	0	identifying animal using clues
	2.	1	0	subtract 3 birds
	3.	1	0	add/remove square to make sets equal
20–21 ▶	4.	1	0	add using fingers
	5.	1	0	which groups total 5
22–25 ▶	6.	1	0	select operation, add/subtract
26–28 ▶	7.	1	0	compare ages; describe solution
29–32 ▶	8.	1	0	finish story using 7 − 4 = 3
33–37 ▶	9.	1	0	identify # sentence
	10.	1	0	tell story that uses subtraction
	11.	1	0	info needed; 7 hats for group
38–44 ▶	12.	1	0	multiply 200 × 12 = total eggs
45–47 ▶	13.	1	0	strategy: # coins to # gumballs
48–49 ▶	14.	1	0	divide 20 by 5: people per car
	15.	1	0	strategy: order coloured cubes
	16.	1	0	strategy: difference of rolled cubes
	17.	1	0	info needed: time to beach
	18.	1	0	18 ÷ 2 = wheels on each side of plane
	19.	1	0	info needed: Quebec to Toronto
	20.	1	0	strategy: fans on bus
	21.	1	0	form a question that uses multiplication
	22.	1	0	select clue to guess 35
Ceiling Item →	23.	1	0	strategy: distance to start
	24.	1	0	which is not a clue to 8053
	25.	1	0	(13 500 − 6000) ÷ 14 = average
	26.	1	0	spend $30 at 25% off sale
	27.	1	0	(2 × 8 × 84) ÷ 144 = volume

Ceiling Item		Errors		Raw Score*
23	−	8	=	15

KeyMath3^{CDN} DA - Interpreting Scores

For **Areas** and **Total Test**	For Subtests
• Standard Scores (*mean = 100, SD = 15, range = 55-145)* • Confidence Intervals • Percentile Rank • Grade Equivalent • Age Equivalent • Growth Scale Value	• Scaled Scores (*mean = 10, SD = 3, range = 1-19*) • Confidence Intervals • Grade Equivalents • Age Equivalents

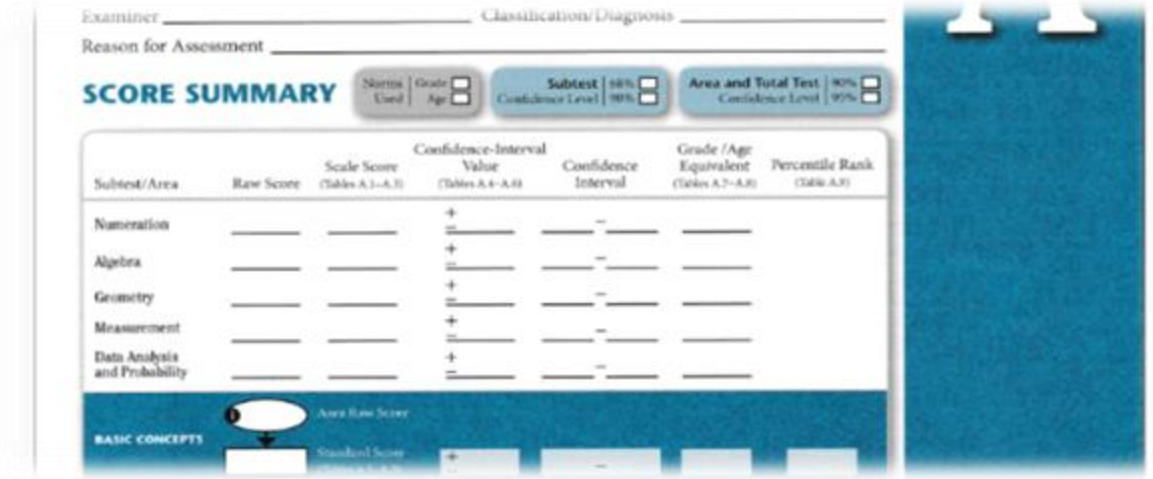
KeyMath3^{CDN} DA Scoring

Transforming Raw Scores

- Obtain Scaled Scores for each subtest from the relevant tables (i.e., Appendix A for Form1)

Raw Score	Scale Score (Tables A.1–A.3)	Confidence-Interval Value (Tables A.4–A.6)	Confidence Interval
15	12	± 1.2	10.8 – 13.2
		±	–

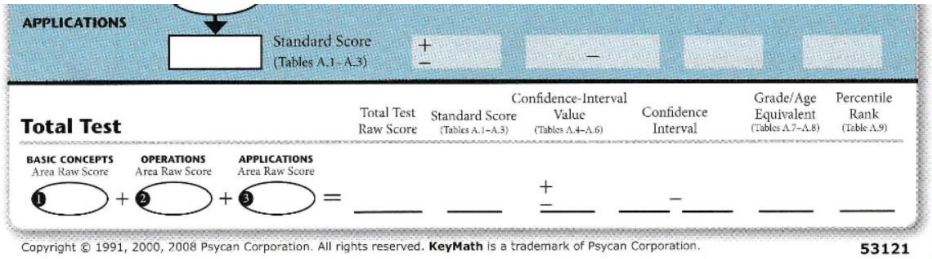
- Complete the score summary front page on the record form, making sure to specify the norms and confidence intervals used



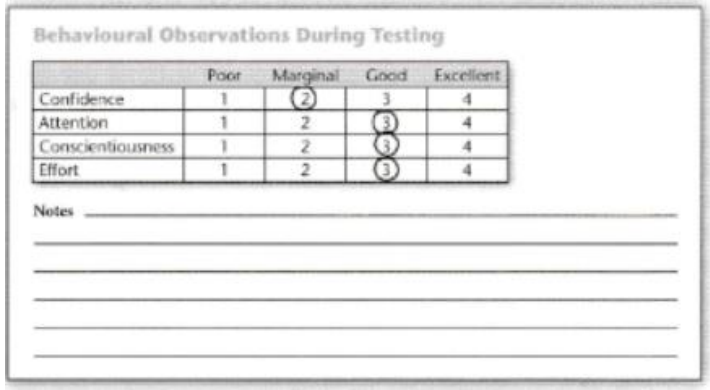
KeyMath3^{CDN} DA Scoring

Completing all Record Form sections

- Scores from the three content areas on the summary page combine to produce the Area and Total Test Scores



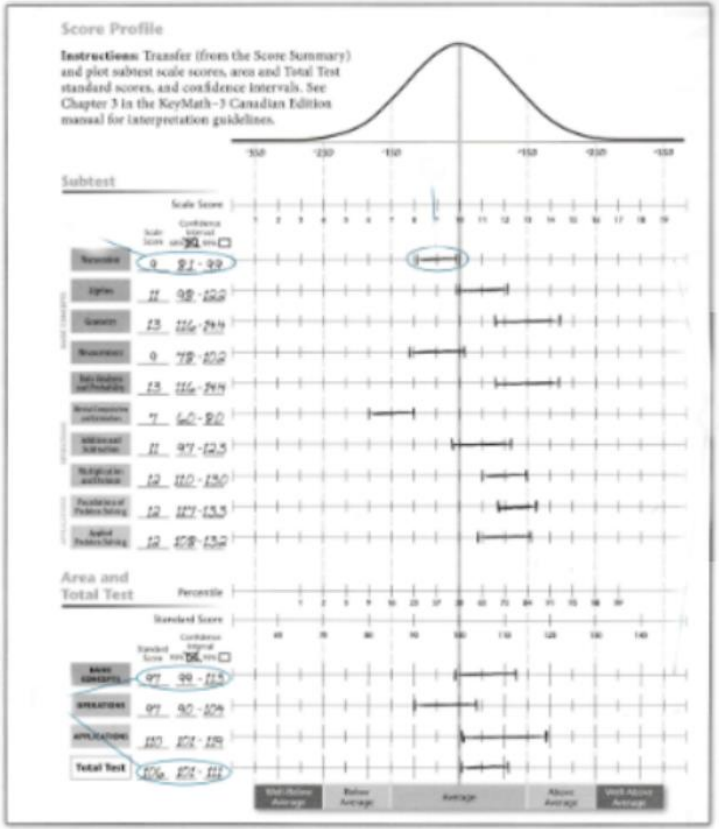
- Remember to note observations throughout testing, then complete the Observation section last



KeyMath3^{CDN} DA Scoring

Score Profile

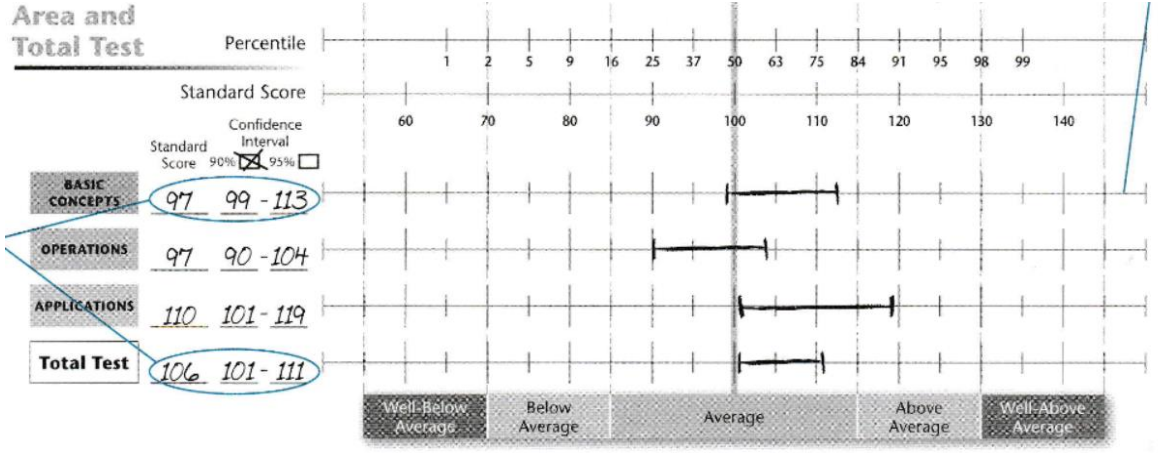
- Score profile plotting is completed on page 7 of the record form by entering the scores and the confidence intervals from the Summary Table



KeyMath3^{CDN} DA

Descriptive Categories

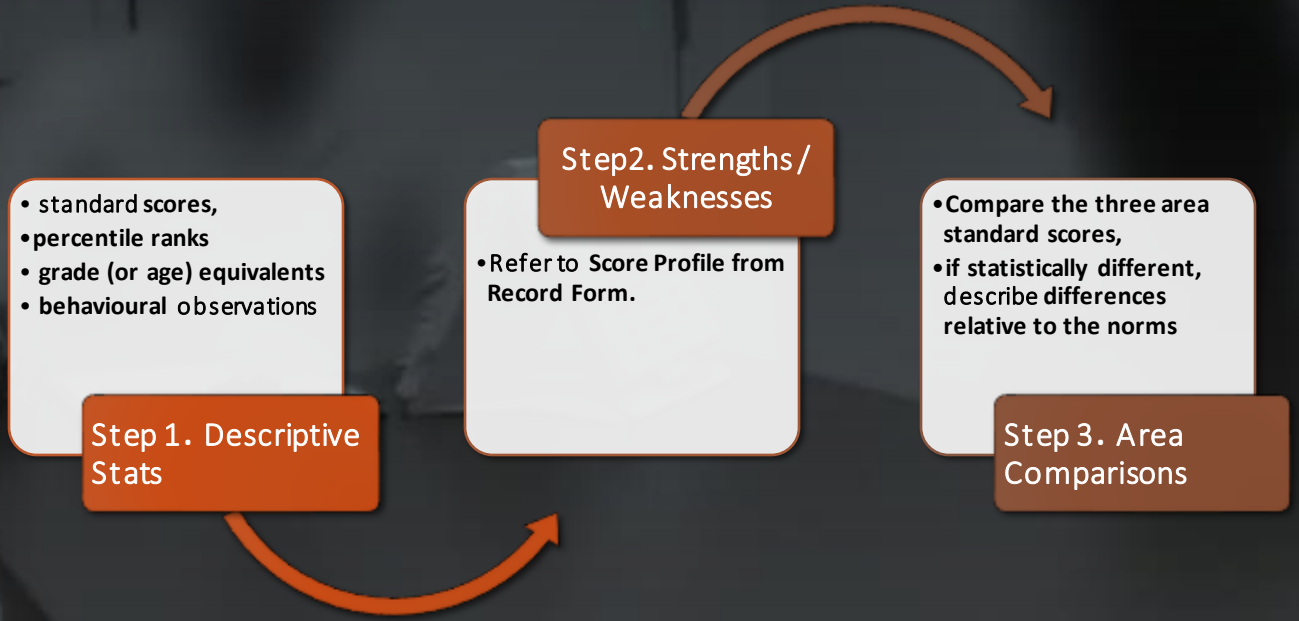
- Plotting relative to the descriptive category, using sample score profile example from the KeyMath3 manual (p. 22)



Descriptive category	Scale score range	Standard score range	Percentile rank range	Standard deviations from the mean
Well-below average	2 or below	70 or below	2 or below	-2.0 or below
Below average	5–7	71–85	3–16	-2.0–1.0
Average	8–12	86–114	17–83	-1.0–1.0
Above average	13–15	115–129	84–97	1.0–2.0
Well-above average	16 or above	130 or above	98 or above	2.0 or above

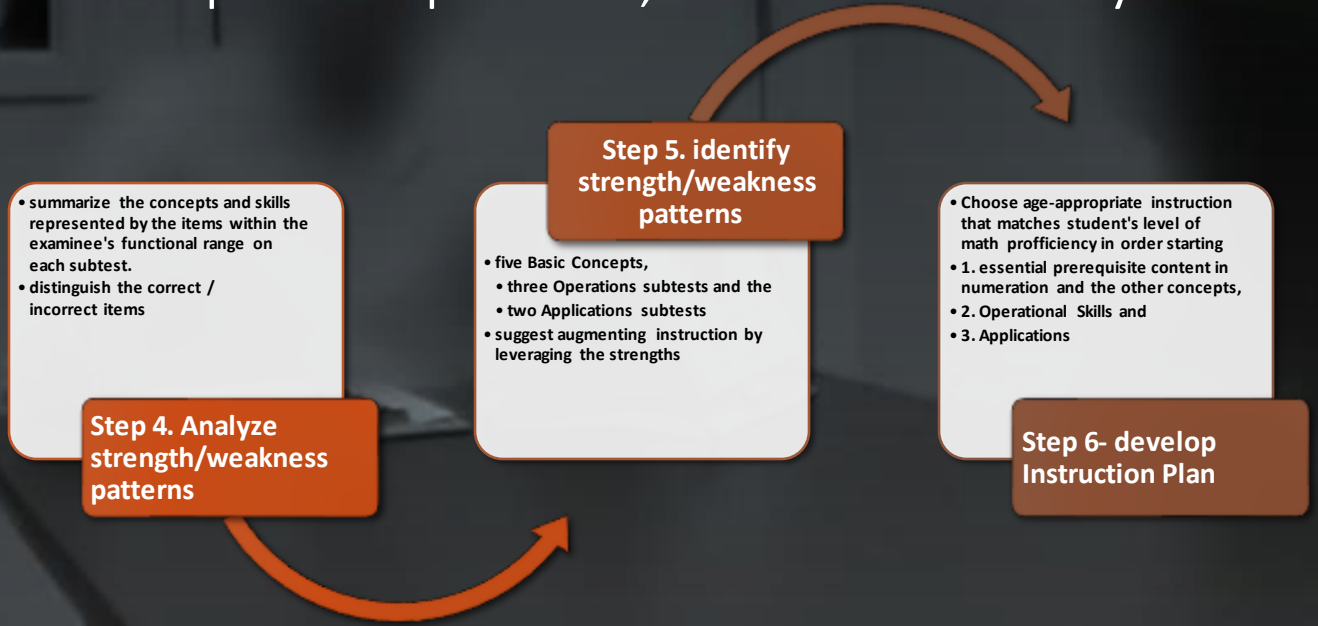
KeyMath3^{CDN} DA - Interpretation

- The six steps to interpretation , as outlined in the KeyMath3^{CDN} Manual



KeyMath3^{CDN} DA - Interpretation

- The six steps to interpretation , as outlined in the KeyMath3^{CDN} Manual



KeyMath3^{CDN}

Computerized Scoring And Reporting with ASSIST Software

Key Features of ASSIST Scoring and Reporting Software

- Quick and accurate scoring of the test
- Pinpoints student strengths and weaknesses
- Links automatically to Essential Resources

ASSIST Reporting - generates

- Comprehensive Narrative Report
- Score Summaries
- Area Comparisons
- Score Profiles
- Item and Functional Range Analysis
- Progress Reports (GSV)
- Parent/Caregiver Letter
- **If items are entered individually the report will include the item-specific behavioural objective, identifying an area of need and linking specific item to the lesson from essential resources**

Items Answered Incorrectly

12 Behavioral Objective: The examinee can identify missing numbers
ER Lesson: Level 1, Cluster 5, Lesson 3: Using a Hundreds Chart

13 Behavioral Objective: The examinee can determine the two-digit n
(representing tens) and individual cubes (representing ones).
ER Lesson: Level 1, Cluster 5, Lesson 1: Counting by Tens

11 Behavioral Objective: The examinee can count by tens up to 100.

KeyMath3[CDN]

Computerized Scoring And Reporting with ASSIST Software

ASSIST Reporting – Progress Report (GSV) example

KeyMath3 **Progress Report - Basic Concepts** Grade Norms Julie A. KeyMath

ID#: Birth Date: 07/06/1988 Sex: Female

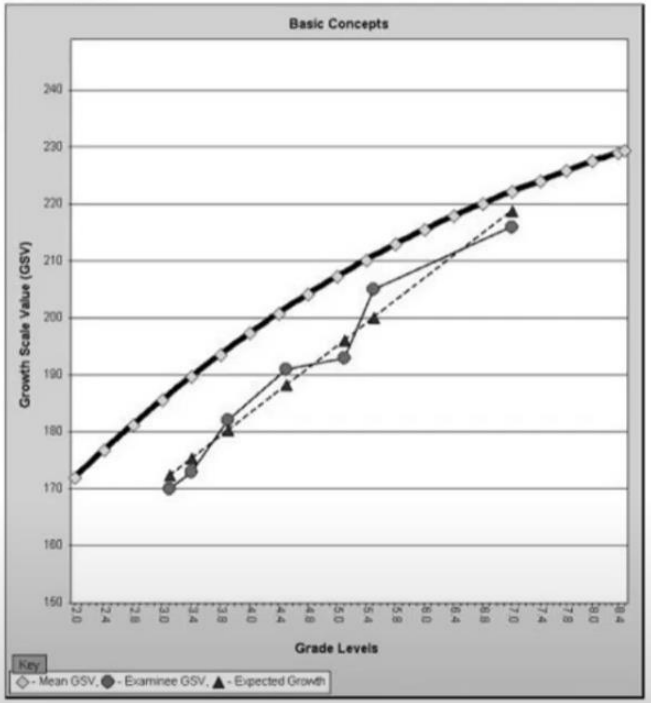
This report depicts Julie's performance over multiple test administrations using the growth scale value (GSV). The GSV is a type of developmental scale score that measures progress over the full range of KeyMath-3 concept and skills.

The GSV Chart presents a graphical display of Julie's progress over administrations. The curved line represents the average GSV of the norm group, the solid line connects each of Julie's plotted GSV scores, and the dashed line shows Julie's overall growth rate averaged across administrations. The table below provides useful data for each administration, including a percentile (%ile) rank, a GSV score, and the change in GSV score since the first administration (Change over baseline). The table also presents growth rates (in GSV units per year) for both Julie and the norm group.

Administrations			Examinee Performance			Growth Rate (GSV per year)	
Test Date	Grade Level	Form	%ile Rank	GSV	Change over baseline	Examinee	Norm Group
09/24/2007	3.1(F)	A	12	170	----	----	----
12/18/2007	3.4(F)	B	16	173	3	12.0	12.3
05/06/2008	3.9(S)	A	21	182	12*	18.6	11.8
01/18/2009	4.5(S)	B	30	191	21*	16.2	11.2
09/12/2009	5.1(F)	A	19	193	23*	12.2	10.7
01/28/2010	5.5(S)	B	42	205	35*	13.6	10.4
08/29/2011	7.0(F)	A	34	216	46*	11.9	9.1

(*) Overall gain is significantly greater than 0.

GSV Chart



Report printed for: dw

Report Date: 08/01/2007

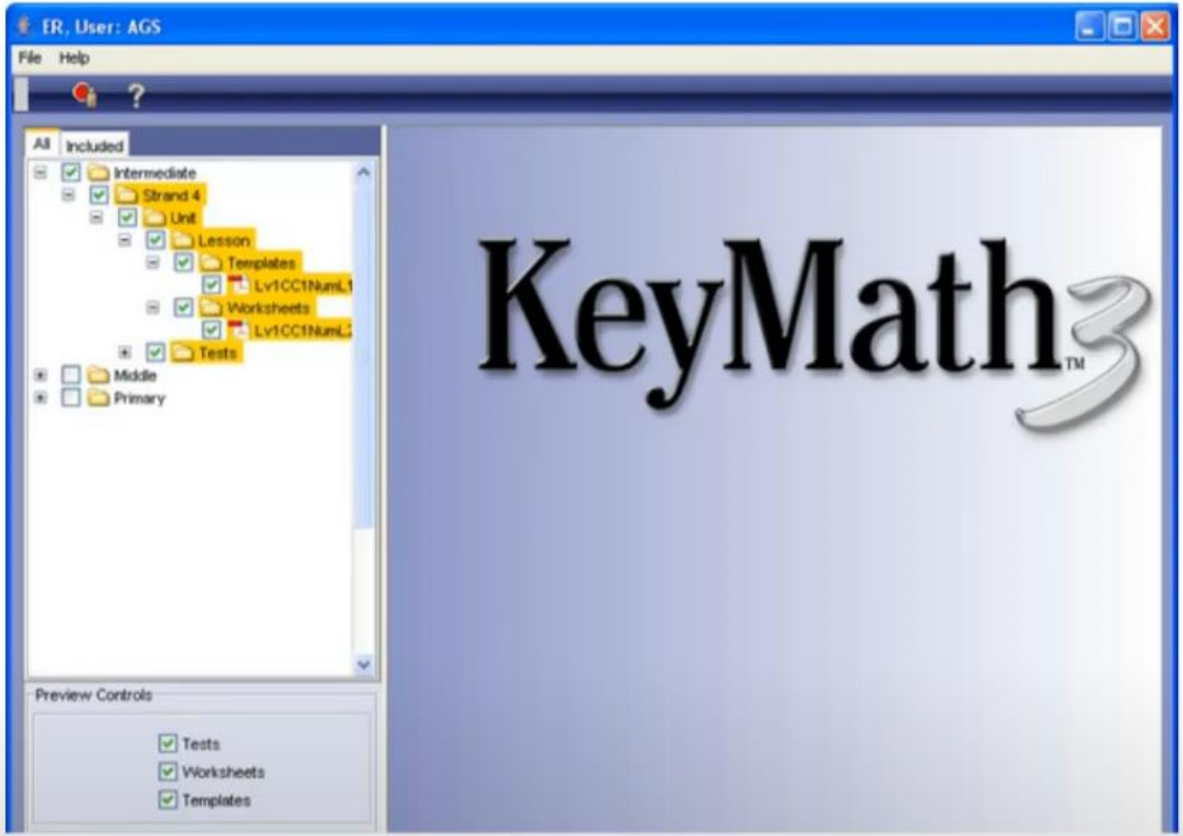
Page 1 of 1

Report generated by KeyMath-3 ASSIST version 1.0

KeyMath3[CDN]

Connecting assessment to Resources through ASSIST Software

ASSIST – linking student scores to recommended lessons

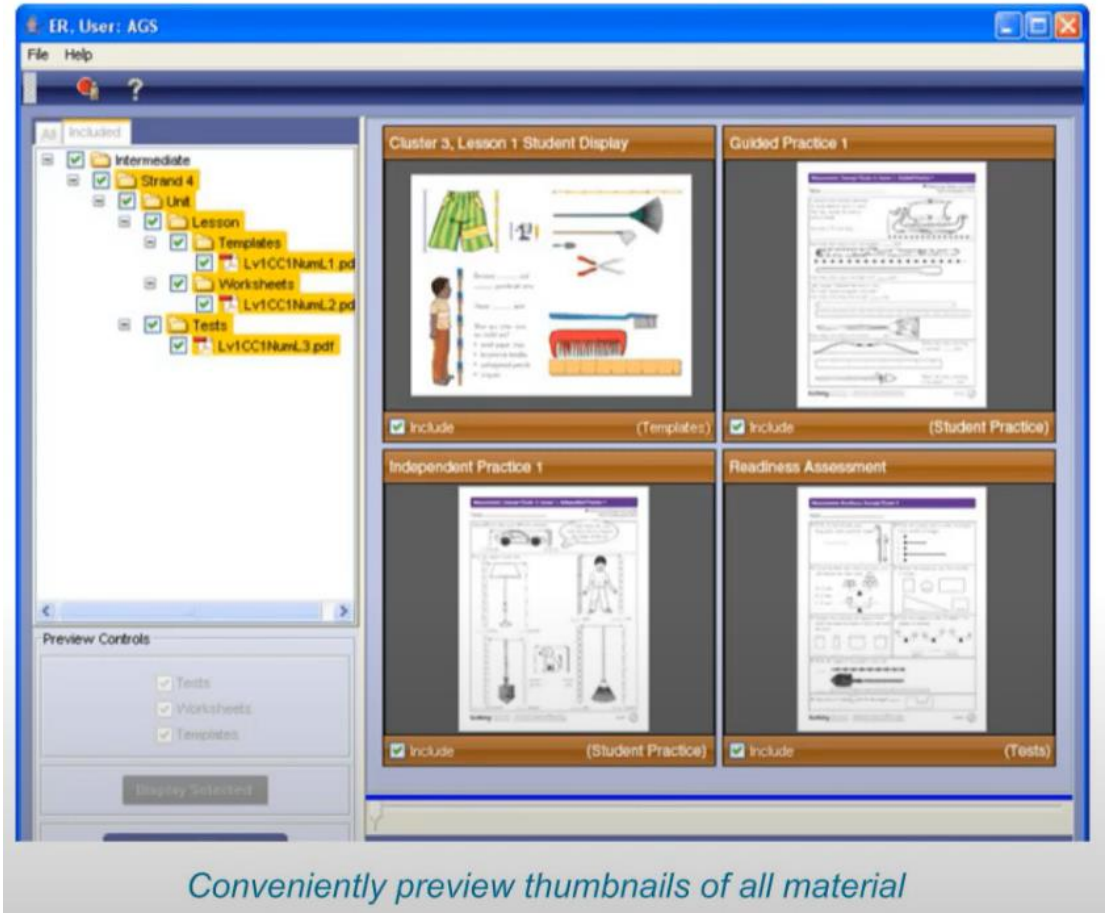


Automatically highlights recommended lessons based on DA results

KeyMath3[CDN]

Connecting assessment to Resources through ASSIST Software

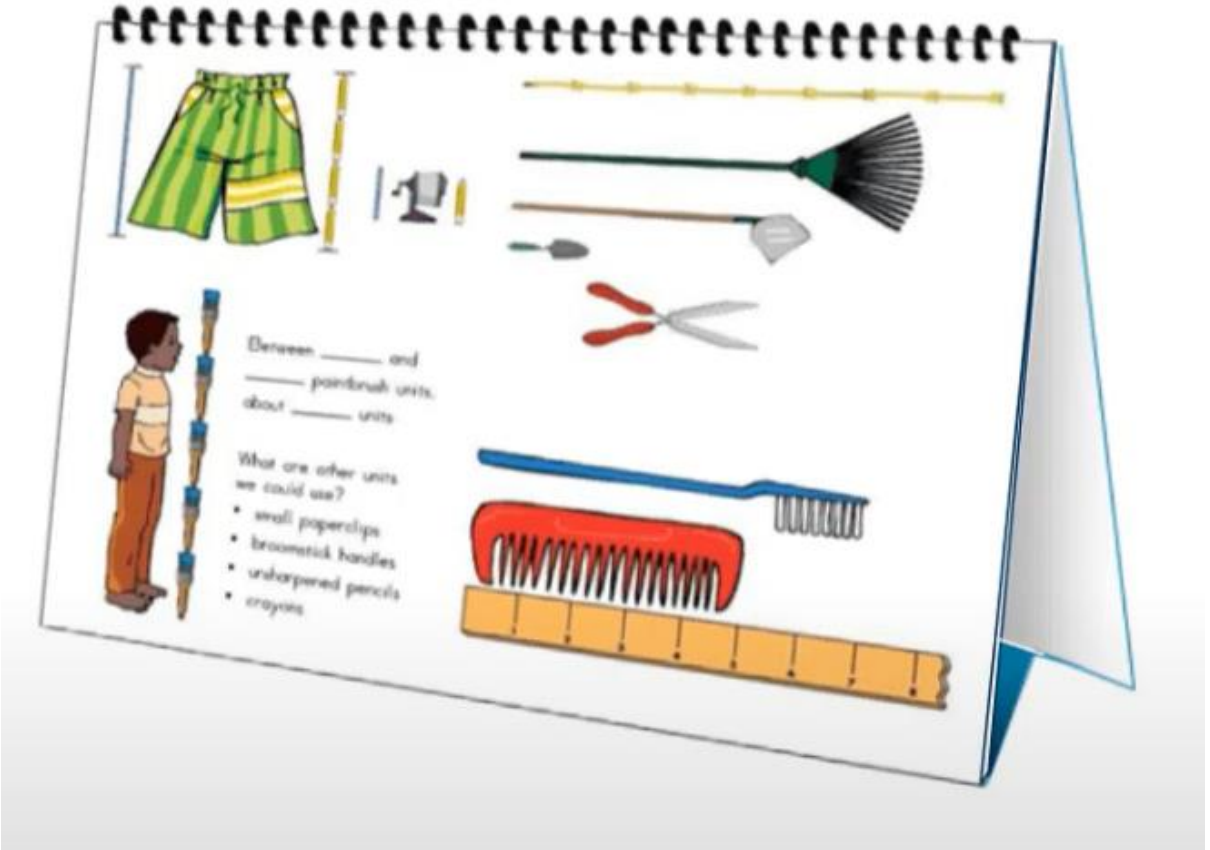
ASSIST – CD-ROM with resources – unlimited prints



KeyMath3[CDN]

Essential Resources component

Essential Resources easel – lesson example



KeyMath3^{CDN}

Reliability

Impact of measurement error estimates (KeyMath3 manual)

Internal Consistency Reliability - using split-half method

- within Forms (A, B)
- between Forms (A, B)
- Spearman-Brown prophecy formula – to adjust correlation of the two halves

Results: reliability is .80/.90 in both forms, for spring and fall
SEMs are from 0.7-2.0 scale points for subtests (or 2-9 standard score points for Area and Total test scores)

Alternate Forms Reliability - using split-half method

- parallel tests (A,B) administered
- looking at difference in item content and temporal variability

Results: similar effects to Internal Consistency

Test-Retest Reliability

Results:
- higher than alternate form coefficients
- small practice effect (about 20% of a SD)

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Validity

Content Validity (KeyMath3 manual)

- NCTM standards (also Canadian curricula respectively)
- 400 educational practitioners contributed
- Several consultants contributed
- Feedback implemented in evaluative purposes
- Items developed to accurately student Math proficiency
- Developmental change adjusted through Median GSV score (average performance and skill from grade to grade
- Relationship among KeyMath3 subtest scores greater than .60
- Correlation with other measures ranged from .6 to .9 (KeyMath Revised–Normative Update, KKTEA-II, ITBS, Measures of Academic Progress, and Group Math).
- Six different exceptional groups tested as well: ADHD, Giftedness, Math LD, Math and Reading LD, and Mild ID
- These groups met the author's expectation for validation evidence with special populations.
- *Results*: **The validity and reliability studies on the KeyMath-3 provided adequate evidence that the 10 subtests measure what the test purports to measure based on grade level.**

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Discussion

Strengths

and

Limitations

Closing Thoughts on the KeyMath3 (DA / ASSIST / ER)

KeyMath3 advantages

- a comprehensive mathematics diagnostic test
- content aligned to the curriculum and standards (US and Canada)
- teachers get reliable and valid information students' learning performance in specific and general math content areas
- user-friendly kits for both examinees and examiners
- ASSIST scoring software automatizes the process
  - identifies areas of need,
  - provides learning objectives and
  - links to individualized resources based on scores

Potential drawbacks

- standardized procedures may need to account for other skills such as reading and writing approaches
- students with hearing, vision impairments or ELL may have difficulty with the assessment
- scores of students with a diverse educational backgrounds may underestimate their proficiency

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Discussion

Strengths

and

Limitations

Closing Thoughts on the KeyMath3 (DA / ASSIST / ER)

To be used judiciously

- administration does require some training (Level B)

- examiner must be familiar with the instructions and the content of the items

- it is not a substitute for a comprehensive assessment

- The KM3 may be mistaken for a one-stop solution by non-psychologists, overlooking a student's underlying issues

- ER component to be evaluated with each case, especially if more effective alternative, evidence-based interventions exist for a specific student

KeyMath3^{CDN}

References

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