M-CAP Training Agenda

• Overview and origins of Math in a CBM Context
• M-CAP Development
• Scoring of M-CAP
• Administration & Scoring Practice
• Questions and Discussion

This training module reflects content and excerpts from the AIMSweb® Math Concepts and Applications Administration and Technical Manual. Please reference this document for further information, test authorship, research references, and additional details.

Summer 2009

History of Math in a CBM Context

– 1983: Early math computation research and probes emerge
  • The first CBM math measures were broad skill-range, graded probes for computation
  • Tindal, Germann, & Deno, 1983.
– 1987: Early math concepts & applications research and probes emerge
  • Early probes covered a range of concepts and applications
  • (Fuchs & Fuchs, 1987; Fuchs, Fuchs, Hamlett, & Stecker, 1991).
– 2000-2001: AIMSweb® is “born!”
– 2004: AIMSweb® releases Math Computation CBM (M-CBM) for grades 1-6
– 2008: AIMSweb® investigates new advances in concepts & applications:
  • Explores a method initially introduced by Fuchs, Fuchs and Zumeta by which the CBM measures are designed to “systematically sample the year-long curriculum so that each skill is represented and receives the same emphasis on each alternate form” (2008, p. 225).
– August 3, 2009: AIMSweb®’s Math Concepts & Applications (M-CAP) is released!
Since the late 1980s, the NCTM has shaped the national perception of what is important for students to learn in mathematics.

- Developed the **NCTM Curriculum and Evaluation Standards (2000)** to ensure students have ability to use math to solve real-life problems.

- **NCTM’s Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics: A Quest for Coherence**, further clarified mathematics expectations from grades K-8.

(See table on next slide)

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### NCTM Curriculum Focal Points by Grade

<table>
<thead>
<tr>
<th>Grade</th>
<th>Focal Point</th>
<th>M-CAP</th>
<th>M-COMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Number and Operations: Base Ten, Place Value</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Number and Operations and Algebra: Basic Facts</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Measurement: Linear Measurement and Length</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Number and Operations and Algebra: Understanding of Facts</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Number and Operations: Fractions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Geometry: Two-Dimensional Shapes</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Number and Operations and Algebra: Facts and Fluency with Whole Numbers</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Number and Operations: Decimals, Fractions and Decimals</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Measurement: Two-Dimensional Shapes</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Number and Operations and Algebra: Fluency with Whole Numbers</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Number and Operations: Decimals, Fractions and Decimals</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Geometry and Measurement: Three-Dimensional Shapes</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>6</td>
<td>Number and Operations: Fluency with Multiplication/Division of Fractions and Decimals</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Number and Operations: Ratios and Rate</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Algebra: Expressions and Equations</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Number and Operations and Algebra and Geometry: Proportionality and Similarity</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Measurement and Geometry and Algebra</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Number and Operations and Algebra: Rational Numbers and Linear Equations</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>8</td>
<td>Algebra: Linear Equations</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Geometry and Measurement: Space, Figures, Angles</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Data Analysis and Number and Operations and Algebra: Data Sets</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

NCTM, 2006
President’s National Mathematics Advisory Panel (NMAP)

• In 2008, the President’s National Mathematics Advisory Panel (NMAP) investigated strategies that were successful in mathematics instruction. The results pertaining to formative evaluation are excerpted below:
  – The NMAP Panel recommends regular use of formative assessment, particularly for students in the elementary grades. . . .
  – For struggling students, frequent (e.g., weekly or bi-weekly) use of these assessments appears optimal, so that instruction can be adapted based on student progress. (NMAP, 2008, p. 31)

• AIMSweb®’s M–CAP is uniquely suited to enable schools to follow the NMAP’s recommendation, as it provides probes that can be administered weekly, biweekly, or monthly, depending on the needs of the student.

NRC: Adding it Up

• According to the 2001 National Resource Council (NRC) report Adding It Up:

  …the mathematics curricula for grades K–8 comprise a number of domains, of which an understanding of number concepts and operations are deemed crucial…

  – The authors consider these domains as “math proficiencies”
  – Deem them as being interwoven and interdependent

  The authors list five crucial strands…
1. **Conceptual Understanding:**
   Comprehension of mathematical concepts, operations, and relations

2. **Procedural Fluency:**
   Skill in carrying out procedures flexibly, accurately, efficiently, and appropriately

3. **Strategic Competence:**
   Ability to formulate, represent, and solve mathematical problems

4. **Adaptive Reasoning:**
   Capacity for logical thought, reflection, explanation, and justification

5. **Productive Disposition:**
   Habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy.

(NRC, 2001, p. 5)

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The **AIMSweb® M–CAP probes** were designed with the NCTM and NCR components in mind, while also incorporating the mathematical domains identified by the NCTM 2006 standards.

Furthermore, **M–CAP** is designed to reflect the NRC’s recommendations regarding instruction, with a focus on ensuring students’ **problem solving, logical reasoning, and application of analytical skills to problems** (NRC, 2001).
**M-CAP Domains by Grade**

Table 3.1 Domains Evaluated by M-CAP by Grade

<table>
<thead>
<tr>
<th>Domain</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number Sense</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Operations</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Patterns &amp; Relations</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Measurement</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Geometry</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Data &amp; Probability</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Algebra</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Probability</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Data &amp; Statistics</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

**An Overview of M-CAP Test Development**

- **Facts about M-CAP:**
  - Developed by professional test developers and math experts.
  - Customer input was also gathered throughout development of M-CAP.
  - Items are based on grade-level and domain-specific criteria.
  - Approximately 11,200 items were developed and field tested before being selected for publication. *(See p. 19 of M-CAP manual for details.)*
An Overview of M-CAP
Test Development

• Facts about M-CAP (cont’d):
  – Items that did not meet psychometric criteria were removed from the item pool.
  – Item placement on each anchor probe was based on increasing item difficulty and probes were designed to be of similar difficulty per grade level.
  – To ensure the sensitivity and maximize the amount of data collected from at-risk learners, easier items were generally placed at the beginning of each probe and more difficult items followed.
  – Additionally, skills are presented in a similar order, frequency, and sequence across each probe and grade level.

Scoring M-CAP

• In M–CAP, answers are either correct or incorrect and each item has a weighted value (1, 2, or 3 points) based on item difficulty.

• No partial-scoring (decreases scoring time significantly!)
  – Least difficult items: 1 point
  – Medium difficulty items: 2 points
  – Most difficult items: 3 points

• Scorer circles the value (1, 2, or 3) in the “Correct” column
• If the answer is incorrect or not answered, the scorer circles the 0 in the “Incorrect” column.
• Once each item is scored, the scorer sums the values in the “Correct” column. The sum is the student’s total score for the probe.
Scoring M-CAP

- Least difficult items: 1 point
- Medium difficulty items: 2 points
- Most difficult items: 3 points

(Values are pre-assigned. Thus, no scorer-subjectivity.)

Scoring M-CAP: No Partial Credit

- **NO partial-credit scoring for M-CAP!**

- Regardless of the construction of the item (e.g., some items have multiple parts), **each item as a whole is either correct or incorrect**

- Even if a student answers only **part** of the item incorrectly, the entire item is incorrect and scored 0
Scoring M-CAP: No Partial Credit

- In this problem, the student must fill in 5 blanks.
- The student actually filled in 3 out of the 5 blanks correctly and two incorrectly.
- Although most of the responses are correct, the entire item receives a score of 0.
- Note. The correct order is -3.8, -8/5, 2/7, 2.9, and 3.6.

Scoring of M-CAP

General Guidelines—questions to ask:
- Is the full answer correct?
  Yes = Full credit
  No = No credit
- Does the student’s response match the answer (or alternate answers) provided on the Answer Key?
  Yes = Full credit
  No = No credit
Scoring of M-CAP

General Guidelines—questions to ask (cont’d)

• If the problem has multiple parts, are all parts answered correctly?
  Yes = Full credit
  No = No credit

• Is the format of the answer correct?
  Yes = Full credit
  No = No credit

Scoring of M-CAP

General Guidelines—questions to ask (cont’d)

• If the task is a money task, did the student present the answer properly?
  – Example: Was a decimal placed properly between whole dollars and change (e.g., $4.40 versus $44.0)?
    Yes = Full credit
    No = No credit
Scoring M-CAP Student Responses

The following scoring criteria and guidelines apply for all grades (2-8)

Scoring of M-CAP

General Guidelines—questions to ask

- Does the answer reflect an understanding of the task type?
  - Example: If the target task is to place unordered numbers (e.g., 1/2, 7/8, 1/3, 4/5) in sequence from least to greatest (e.g., 1/3, 1/2, 4/5, 7/8), the answer must reflect the proper sequence.
  - If the student takes additional steps, such as converting a mixed number to a decimal (e.g., .33, 1/2, 4/5, 7/8), the order must still be correct.
  - If there is an error in conversion (e.g., .43, 1/2, 4/5, 7/8), even if the result is in the correct order, the response is incorrect.
Scoring M-CAP: Multi-Part Problems

Grade 2 multi-part problems:

15. Fill in the blanks.
   \[ 912 = \text{\ } \text{ hundreds, } \text{\ } \text{ tens, } \text{\ } \text{ ones} \]
   \[ \times \] (0 points)

22. Fill in the blanks.
   \[ 428 = \text{\ } \text{ hundreds, } \text{\ } \text{ tens, } \text{\ } \text{ ones} \]
   (Full point value)

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Scoring M-CAP: Multi-Part Problems

Grade 3 multi-part problems:

3. Complete the sequence.
   \[ 30, 36, 42, \_48\_56 \] (0 points)

6. Write the correct number in each blank.
   \[ 935 = \_9\_ \text{ hundreds, } \_3\_ \text{ tens, } \_5\_ \text{ ones} \]
   (Full point value)

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Scoring M-CAP: Multi-Part Problems

Grade 4 multi-part problems:

Use the table to answer the question.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time Taken by Dean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sprinting</td>
<td>35 minutes</td>
</tr>
<tr>
<td>Cycling</td>
<td>40 minutes</td>
</tr>
<tr>
<td>Swimming</td>
<td>10 minutes</td>
</tr>
<tr>
<td>Running</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>

What is the total time taken by Dean for his cross-country marathon practice?

2 \text{ hour } 55 \text{ minutes}

\[ \times \] Incorrect (0 points)

Use the table to answer the question.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time Taken by Dean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sprinting</td>
<td>35 minutes</td>
</tr>
<tr>
<td>Cycling</td>
<td>40 minutes</td>
</tr>
<tr>
<td>Swimming</td>
<td>10 minutes</td>
</tr>
<tr>
<td>Running</td>
<td>30 minutes</td>
</tr>
</tbody>
</table>

What is the total time taken by Dean for his cross-country marathon practice?

1 \text{ hour } 55 \text{ minutes}

\[ \checkmark \] Correct (Full point value)

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Scoring M-CAP: Multi-Part Problems

Grade 5 multi-part problems:

9,309,552

Which digit is in the millions place?

3 \[ \times \]

Which digit is in the thousands place?

Which digit is in the hundreds place?

\[ \checkmark \] Correct (Full point value)

Maria started cycling at time A. She stopped cycling at time B.

Maria cycled for a total of 2 hours and 10 minutes.

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Scoring M-CAP: Multi-Part Problems

Grade 6 multi-part problems:

17. Write the answer in each blank.
Note: 16 oz = 1 lb
98 oz = ______ lb ______ oz

X Incorrect (0 points)

20. Write the numbers from least to greatest.

\[
\frac{11}{12}, \frac{9}{12}, \frac{3}{12}, \frac{12}{15}, \frac{9}{15}, \frac{11}{13}, \frac{3}{12}, \frac{3}{12}, \frac{3}{12}
\]

\[\frac{11}{12} < \frac{9}{12} < \frac{3}{12} < \frac{3}{12} < \frac{3}{12}
\]

X Incorrect (0 points)

Correct (Full point value)

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Scoring M-CAP: Multi-Part Problems

Grade 7 multi-part problems:

1. Write these numbers in increasing order.

\[
\frac{3}{2}, -3.5, 0.1, 1.7, 2
\]

X Incorrect (0 points)

6. Write <, >, or = in each blank.

\[
\frac{10}{11} > \frac{19}{21} > \frac{10}{12}
\]

X Incorrect (0 points)

Correct (Full point value)

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Scoring M-CAP: Multi-Part Problems

Grade 8 multi-part problems:

9. Write these numbers in increasing order.
   \[
   \frac{7}{2}, 2.5, \frac{3}{5}, -1.4
   \]
   \[\frac{7}{2} \times \frac{2}{5} + \frac{3}{5} < \frac{2}{5}\]
   \[\checkmark\] Correct (Full point value)

10. On a blueprint, the dimensions of a park are 25 centimeters (cm) by 10 cm. The blueprint uses a scale of 1 cm = 7 meters (m). What are the actual dimensions of the park?
   \[175 \text{ m by } 70 \text{ m}\]
   \[\xmark\] Incorrect (0 points)

Scoring M-CAP: Incomplete Problems

Scoring Incomplete Problems:
- Because there is no partial-credit scoring, an incomplete problem is incorrect.
- In the case of a multi-part item, if the student leaves any part of the problem incomplete or unanswered, the item is incorrect.

11. How much money is pictured below?
   \[\xmark\] Incorrect (0 points)
Scoring M-CAP: Crossed Out Problems

Scoring Crossed Out Problems:

• If a student shows his or her work, but then crossed or X-ed out the problem without placing the answer in the blank, the item is incorrect.

= No points are given.

Robertito weighs 120 pounds (lb) and his father weighs 205 lb. How much less is Roberto’s weight than his father’s weight?

\[
\begin{array}{c}
\text{lb} \\
180 \times \\
205 \\
\hline
350 \\
\end{array}
\]

\[
\begin{array}{c}
\text{Incorrect (0 points)} \\
\end{array}
\]

Scoring Crossed Out Problems:

• If the student has crossed out the problem, but then returned to the item and placed an answer in the blank, score the item based on whether or not the answer placed in the blank is correct.

= Points may be possible.

Kevin weighs 57 kilograms (kg) and his father weighs 85 kg. How much less is Kevin’s weight than his father’s weight?

\[
\begin{array}{c}
\text{kg} \\
31 \times \\
85 \\
\hline
54 \\
\end{array}
\]

\[
\begin{array}{c}
\text{Incorrect (0 points)} \\
\end{array}
\]

Kevin weighs 115 pounds (lb) and his father weighs 198 lb. How much less is Kevin’s weight than his father’s weight?

\[
\begin{array}{c}
\text{lb} \\
83 \times \\
198 \\
\hline
115 \\
\end{array}
\]

\[
\begin{array}{c}
\text{Correct (Full point value)} \\
\end{array}
\]
Scoring M-CAP: Illegibility

Scoring problems with reversals and/or illegible answers:

• Keep in mind the intent of using M-CAP probes: Determining a student’s understanding of the task and progress throughout the school year.

• If the response is hard to read, but can be determined, score the answer as correct.

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### House Sales

<table>
<thead>
<tr>
<th>Year</th>
<th>Houses</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>10,124</td>
</tr>
<tr>
<td>2003</td>
<td>12,015</td>
</tr>
<tr>
<td>2004</td>
<td>14,767</td>
</tr>
<tr>
<td>2005</td>
<td>16,290</td>
</tr>
</tbody>
</table>

How many more houses were sold in 2003 than in 2002? 191

Answer key: 1891

Correct
(Full point value)

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### Laptop Sales

<table>
<thead>
<tr>
<th>Year</th>
<th>Laptops</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>18,285</td>
</tr>
<tr>
<td>1999</td>
<td>20,325</td>
</tr>
<tr>
<td>2000</td>
<td>24,631</td>
</tr>
<tr>
<td>2001</td>
<td>25,742</td>
</tr>
</tbody>
</table>

How many more laptops were sold in 2000 than in 1999? 4,306

Answer key: 4306

Incorrect (illegible)
(0 points)

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**Scoring M-CAP: Reversals**

Scoring problems with reversals and/or illegible answers:

- Keep in mind the intent of using M-CAP probes: Determining a student’s understanding of the task and progress throughout the school year.

- If the response is reversed, but it is obvious what digit the student intended, score as correct.

<table>
<thead>
<tr>
<th><strong>Laptop Sales</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year</strong></td>
</tr>
<tr>
<td>1998</td>
</tr>
<tr>
<td>1999</td>
</tr>
<tr>
<td>2000</td>
</tr>
<tr>
<td>2001</td>
</tr>
</tbody>
</table>

How many more laptops were sold in 2001 than in 2000? 1,956

Answer key: 1340

- Correct
(Full point value)

**Scoring M-CAP: Reversals**

Scoring problems with reversals and/or illegible answers:

- Keep in mind the intent of using M-CAP probes: Determining a student’s understanding of the task and progress throughout the school year.

- If the response is rotated, and it cannot be easily determined what digit was intended, score as incorrect.

<table>
<thead>
<tr>
<th><strong>Computer Sales</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year</strong></td>
</tr>
<tr>
<td>2000</td>
</tr>
<tr>
<td>2001</td>
</tr>
<tr>
<td>2002</td>
</tr>
<tr>
<td>2003</td>
</tr>
</tbody>
</table>

How many more computers were sold in 2003 than in 2002?

8,402

Answer key: 11609

- Incorrect
(0 points)
Scoring M-CAP: Improper Use or Placement of Math Symbols

Scoring problems with improper use or placement of Math Symbols:

• The proper placement and use of mathematical symbols is a vital part of determining the correctness of an answer.

• Generally, M–CAP probes provide the appropriate symbols on money, measurement, and time items.

• If a student also adds a symbol, and does so correctly, the addition will not affect the scoring of that item;

• however, if a student adds the symbol incorrectly or adds the wrong symbol, the item is considered incorrect.

Three examples are provided...

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Scoring M-CAP: Improper Use or Placement of Math Symbols

Scoring problems with improper use or placement of Math Symbols:

• This item presents a picture of a dollar bill and six coins, then asks the student to provide the amount of money shown in the art, and the answer blank provides the dollar ($) symbol.

• The correct answer is 1.35.

• The elements necessary to make the answer correct are:
  – The proper number amount
  – The inclusion and proper placement of the decimal point.

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Scoring M-CAP: Improper Use or Placement of Math Symbols

Scoring problems with improper use or placement of Math Symbols:

- This item presents a picture of a dollar bill and six coins, then asks the student to provide the amount of money shown in the art, and the answer blank provides the dollar ($) symbol.
- The correct answer is 1.35.
- The elements necessary to make the answer correct are:
  - The proper number amount
  - The inclusion and proper placement of the decimal point.

Answer key: 1.35  Correct  (Full point value)

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Scoring M-CAP: Improper Use or Placement of Math Symbols

Scoring problems with improper use or placement of Math Symbols:

- Had the student added the dollar symbol before the answer (see right), the answer would still be correct.

Answer key: 1.35  Correct  (Full point value)

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Scoring M-CAP: Improper Use or Placement of Math Symbols

Scoring problems with improper use or placement of Math Symbols:

• Other incorrect uses of a symbol in this item type include, but are not limited to:

  – **Incorrect placement of the dollar sign ($)**
    
    Answer Key: $4.12
    
    Student response: 4.12$  

  – **Using a colon (:) rather than a decimal (.) between the dollar and cents amount:**
    
    Answer Key: $4.12
    
    Student response: $4:12$  

  – **Not including the decimal in favor of using a cent symbol.**
    
    Answer Key: $0.04
    
    Student response: 4¢  

These are considered incorrect because they indicate a lack of understanding regarding how to present money correctly.

Scoring M-CAP: Improper Use or Placement of Math Symbols

Scoring problems with improper use or placement of Math Symbols:

• Other incorrect uses of a symbol in this item type include, but are not limited to:

  – **Omitting Decimal symbol (.)**
    
    Answer Key: $6.23
    
    Student response: $623$  

  – **Using a numerical response (digits) when the actual written word is required:**
    
    Answer Key: penny
    
    Student response: $0.01$  

  – **Including the wrong unit of measure, placing it in the wrong location, or omitting it altogether**
    
    Answer Key: 20 feet
    
    Student responses: feet 20
    ft 20
    
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    20
Scoring M-CAP: Clock Reading

Scoring problems with Clock Reading:

- Although, as with money tasks, the M–CAP provides the proper symbol in the answer blank, some students may write the complete answer (hour and minutes) in one of the blanks. In doing so:
  - These students may or may not use the proper symbol to separate the hour and minutes.

Correct (Full point value)

Incorrect (0 points)
Scoring M-CAP Student Responses

The following scoring criteria and guidelines apply for specific grades in which the following problems are presented.

Scoring M-CAP: Grades 2,3,5

Recommendations

Scoring problems with Clock Reading:

- Although, as with money tasks, the M–CAP provides the proper symbol in the answer blank, some students may write the complete answer (hour and minutes) in one of the blanks.

- In doing so:
  - These students may or may not use the proper symbol to separate the hour and minutes.

Answer Key: 1 : 30

Alternative responses:

- Correct (Full point value)
- Incorrect (0 points)

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Scoring M-CAP: Rounding, Reducing / Simplifying, & Converting

Scoring problems with Rounding, Reducing / Simplifying & Converting (Grades 4-8 only)

- Starting in grade 4, students are asked to estimate answers.
- This estimate may be to the nearest 10s place, 100s place, and so on.
- Where possible, each item was designed so the answer is the same whether the student rounds before or after completing the problem.
- Where this was not possible, and two answers can be considered correct depending on when rounding occurred, 2 answers are provided on the Answer Key.
- Answers should not be rounded unless the item expressly requests that action.

Answers should not be rounded unless the item expressly requests that action.
Scoring M-CAP: Reducing / Simplifying Fractions

Scoring problems with Reducing / Simplifying Fractions

- Unless the item expressly asks students to reduce a fraction, reducing a fraction to its lowest form is **not required** for a correct answer.

- However, because many students reduce fractions without being asked—**as long as the reduction is correct, the answer is correct.**
  - For this reason, where reduction of an answer is possible the Answer Key provides both the initial fraction produced by working the problem and the lowest reduction possible of that fraction.
    
    **Either answer is correct.**
  - Every possible reduction between the original fraction are not provided. If the student decided to reduce—and the final (lowest) reduction is not provided, the answer is **not considered correct.**

- If the student **chooses to reduce** (when it is not required to do so), the reduction **must be the lowest possible reduction.**

**IN SUMMARY:**

- Unless the item expressly asks students to reduce a fraction, reducing/simplifying a fraction to its lowest form is **not required** for a correct answer.

- If the student **chooses to reduce** (when it is not required to do so), the reduction **must be the lowest possible reduction.**
Scoring M-CAP: Reducing / Simplifying Fractions

Example 1: Problem not reduced – reduction not required in directions.

Example 2: Problem reduced to lowest common denominator by student choice — reduction not required in directions.

Example 3: Problem reduced by student choice – but reduction done incorrectly.
Scoring M-CAP: Converting Mixed Numbers to Decimals

Scoring problems with Converting Mixed Numbers to Decimals

Grades 6-8

• Some problems ask the students to sequence numbers that include mixed numbers and decimals, either from greatest to least or least to greatest

• The expectation is that students take the provided numbers and correctly sequence them in the number format presented

• Some students may decide to reduce the fractions and to convert the resulting mixed numbers to decimals
  – If the reduction and conversion are done correctly and then sequenced correctly, the answer is correct
  – If the student makes an error in reduction or conversion, the answer is incorrect, whether not the final sequencing is correct based on the incorrect conversion

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### Example 1:
Student did not convert fractions. Answer correct.

### Example 2:
13/3 converted to 4 1/3. Answer correct.
Scoring M-CAP: Converting Mixed Numbers to Decimals

20. Write the numbers from least to greatest.

\[
\frac{3}{5}, \frac{2}{9}, \frac{13}{3}, 2, \frac{3}{7}
\]

\[
\frac{3}{8} < \frac{3}{9} < \frac{3}{7} < \frac{3}{9} < \frac{4}{2}
\]

\[\times\] Incorrect (0 points)

Example 3: Student did not convert fractions properly. Answer incorrect.

Scoring problems with Converting Mixed Numbers to Decimals

Grades 6-8

- Students are also asked to complete number sequences that include mixed numbers and decimals
- The same rules apply to number sequencing problems as to items in the previous three examples
Scoring problems with Converting Mixed Numbers to Decimals

Grades 6-8

- Students are also asked to complete number sequences that include mixed numbers and decimals
- The same rules apply to number sequencing problems as to items in the previous three examples

Example 1: No conversion.
Sequence completed correctly.

Example 2: Conversion used.
Sequence completed correctly.

Example 3: Conversion used.
Sequence completed incorrectly.

Correct (Full point value)

Incorrect (0 points)
M-CAP Practice Exercises

Break into groups of two and locate your M-CAP practice exercises

Directions:
1. Find a partner (i.e., break into groups of two).
2. Locate a pencil (preferred) or pen.
3. Assign one partner the Grade 2 probe. The other will complete the Grade 7 probe.
4. Your Certified AIMSweb® Trainer (CAT) will read the Grade 2 directions first. Wait to begin taking the test until your trainer has also read the Grade 7 directions.
5. Your Certified AIMSweb® Trainer (CAT) will tell you when to begin taking the test.
Directions:

6. Complete the test as if you were a “mock” student. Make occasional errors. Those may include, though not be limited to:

   a. Reversals
   b. Illegible responses
   c. A mixture of incorrect and correct responses
   d. Improperly or partially converted/reduced fractions or decimals
   e. Skipped items
   f. Other responses “typical” of students in Grades 2 or 7, respectfully.

7. After 8 minutes, your CAT will tell those taking the Grade 2 probe to stop and put your pencils down.

8. After 10 minutes, your CAT will tell those taking the Grade 7 probe to stop and put your pencils down.

9. Exchange your test with your partner.

10. Using the Answer Key provided, score your partner’s test and calculate the total score. Write this score on the Answer Key.

11. As a group, discuss any questions with your CAT.
M-CAP Questions & Discussion

QUESTION:
What is M-COMP, as referenced in our earlier slide comparing skill domains for M-CAP and M-COMP?

ANSWER:
In the literature, general math computation CBM is referred to as M-COMP.

As noted by Fuchs, Fuchs, and Zumeta (2008), CBM for mathematics currently consists of two mathematics domains:

- CBM computation (CBM-COMP) and CBM-APP.
- CBMCOMP monitors students’ progress on fundamental computation skills, including single-digit addition through addition, subtraction, multiplication, and division of decimals and fractions.

Computation skills are assessed in isolation, without emphasis on how these skills are applied to problem-solving settings (Fuchs et al., 1994).
FAQs

QUESTION:
May the examiner read the M-CAP item directions for students with reading difficulties?

ANSWER: It is not appropriate to read the questions to students. M-CAP may not be appropriate for all students. This issue and special circumstances are addressed in the manual and guidance is given for progress monitoring students who may need special accommodations.

The role of reading is important in many "math tests." Yes, a few students may have difficulty with the reading and not that this issue is irrelevant; however, reading is part of Applications and Problem Solving.

Reading is also often found on Math Applications problems required on many state and other summative, high-stakes tests. It may be that if a student performs poorly on the M-CAP due to reading issues that the intervention involves reading—and/or math application skill development as well.

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FAQs

QUESTION:
May students use calculators/manipulatives for M-CBM or M-CAP?

ANSWER: No.

In addition to the use of calculator thus altering how the test was normed and standardized, we are also looking for authentic skill assessment of how well students can complete math applications. Fluent math computation skills are an underlying—and often prerequisite—component of Math Applications skill.
FAQs

QUESTION: On the Practice Exercise from the Training Module for M-CAP, the 7th grade probe, question 11 results in an answer of:

AB

What if the student writes the answer as:

AB

(without the line above AB)

ANSWER: We allow for some teacher discretion per appendix C of the M-CAP Administration and Scoring manual. Either answer would seem acceptable.

FAQs

QUESTION: May students use the probes as practice after testing? May teachers review the content with the students after testing?

ANSWER: Standardized tests should never be used for practice.

Example: What if the student, if being progress monitored, is to take a very similar test in the near future? This would be problematic and potentially influence outcomes due to practice effect. The teacher should work with the student on the item types outside of the actual test.
FAQs

QUESTION:
Why are there no probes for M-CAP for Grade 1?

ANSWER: Grade 2 is generally when students are able to complete applied mathematics and the related reading involved in the M-CAP problems.

FAQs

QUESTION:
Is there a typo on the answer key for time-telling problems?

Example:
Problem: Write the time.

Answer Key:

ANSWER: No, there is no “typo.” The answer key provides the two digits needed to the left and right of the “:” (colon) in the answer blank.
FAQs

QUESTION:
Can we give the math probe one page at a time if we suspect the kids will shut down before they even start if they see a 3-page probe?

ANSWER: This measure is designed to not have a “ceiling,” meaning that there are more problems on the test than we anticipate even the most expedient of students to complete. Letting your students know that the test is designed to have more on it than what you expect them to complete in 8 (or 10) minutes may be helpful. That said, the standardized directions are not alterable.

It may be helpful to know that this measure was field tested and piloted extensively. Additionally, it was vetted through a variety of working school professionals in the field (e.g., teachers, administrators, math specialists, etc.). Items found to be significantly problematic during our field testing and piloting was addressed so that the final measures released were sound. It appears, via that process, that the 3 pages presented at once did not pose a significant problem for students to the point where it impacted the results of the test or their performance.

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