

Minnesota

# Minnesota Comprehensive Assessments-Series III

Mathematics Item Sampler  
Grade 6



Minnesota  
Department  
of Education



## Grade 6 Formula Sheet

You may use the following formulas to solve problems on this test.

Formulas	Variables
$A = bh$ $A = \frac{1}{2}bh$ $A = \frac{1}{2}h(b_1 + b_2)$	$A$ = area $b$ = base $h$ = height
$V = Bh$	$B$ = area of base $h$ = height $V$ = volume
$s = 180(n - 2)$	$n$ = number of sides $s$ = sum of angles



## Mathematics Test General Directions to the Student

- This test contains two segments. You will be told when to begin each segment.
- Your answers must be marked in your answer document, but you may write in this test book as scratch paper.
- This test has multiple-choice and gridded response questions.
- For each question, choose the answer you think is best. Answer each question by filling the circle in your answer document. Each circle must be filled in completely for your answer to be scored.
- The sample question shows an example of the questions that will be on the test. The sample questions show the answer filled in correctly.

**Sample Question:**       $20 - 8 =$

A.    8  
B.    10  
C.    12  
D.    16

**Sample Answer:**       A    B    C    D

**Sample Question:**     $\$3.25 + \$1.10 =$

**Sample Answer:**

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- You **may not** use a calculator for Segment 1.
- You **may** use a calculator for Segment 2.
- When you finish a segment of the test, stop and check your answers. Then use the sticker given to you to seal it. Once you seal a segment, you cannot go back to it. Each segment must be sealed before you move on to the next segment.

**NOTICE:      THESE TEST ITEMS ARE SECURE MATERIALS AND  
MAY NOT BE COPIED OR DUPLICATED IN ANY WAY.**

**This reflects the information on the actual test.  
The item sampler test book may be duplicated.**





## Segment 1

Your teacher will tell you when to begin this segment.

You **MAY NOT** use a calculator for this segment.



# Mathematics Test — Segment 1

1

1. Which is equivalent to  $4^3$ ?

- A. 12
  - B. 48
  - C. 64
  - D. 81
- 

2. Divide.

$$1\frac{1}{10} \div 1\frac{1}{5}$$

- A.  $\frac{11}{12}$
- B.  $\frac{25}{33}$
- C.  $1\frac{8}{25}$
- D.  $1\frac{1}{2}$



3. Riley has 200 stamps.

- 35% are from Europe.
- 10% are from Asia.
- 20% are from Australia.

The rest of the stamps are from North America. How many of Riley's stamps are from North America?

- A.** 35  
**B.** 65  
**C.** 70  
**D.** 130
- 

4. What is the prime factorization of 630?

- A.**  $2 \times 3 \times 5 \times 7$   
**B.**  $2 \times 3^2 \times 5 \times 7$   
**C.**  $2 \times 3^2 \times 35$   
**D.**  $2 \times 5 \times 7 \times 9$

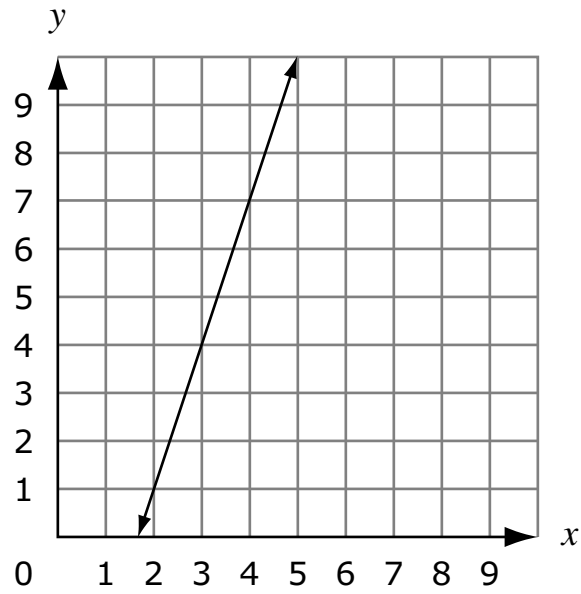
5. An equation is shown.

$$j = 7k + 5$$

When the value of  $k$  increases by 2, by what amount does the value of  $j$  increase?

- A. 2
- B. 9
- C. 12
- D. 14

6. A graph is shown.



What is the equation of the line on the graph?

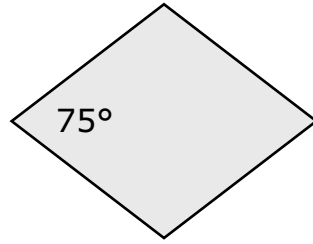
- A.  $y = x - 1$
- B.  $y = x + 3$
- C.  $y = 3x + 1$
- D.  $y = 3x - 5$

7. Simplify.

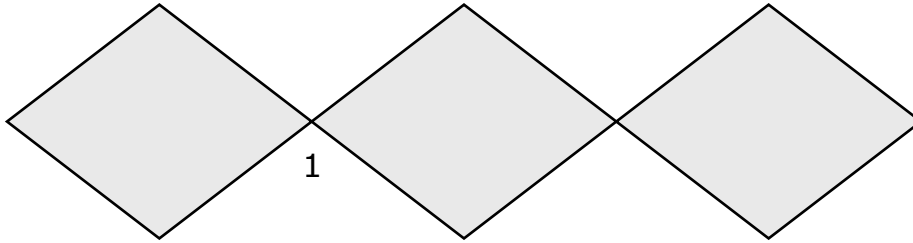
$$4\left(\frac{1}{2} + \frac{3}{8}\right) - \frac{5}{8} \cdot 2$$

- A.  $1\frac{1}{8}$
- B. 2
- C.  $2\frac{1}{4}$
- D.  $5\frac{3}{4}$

8. A rhombus is shown.



The rhombus is used to make a design.



What is  $m\angle 1$ ?

- A.  $15^\circ$
- B.  $75^\circ$
- C.  $105^\circ$
- D.  $150^\circ$

Put sticker  
here

**This is the end of Segment 1.**

Check your work, then  
**SEAL** Segment 1.



## Segment 2

Your teacher will tell you when to begin this segment.

You **MAY** use a calculator for this segment.



## Mathematics Test — Segment 2

9. Which statement is true?

A.  $\frac{1}{6} = 0.16$

B.  $0.08 = \frac{4}{5}$

C.  $0.25 < \frac{1}{4}$

D.  $\frac{1}{3} > 0.3$

2

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10. Kelly makes 12 candles in 3 hours. Lee makes 6 candles in 1 hour. What is the difference in the numbers of candles they each make in 8 hours?

A. 2

B. 8

C. 16

D. 48

---

11. A bottle of soap costs \$3.45 for 64 ounces. What is the cost per ounce?

A. \$0.05

B. \$0.19

C. \$0.22

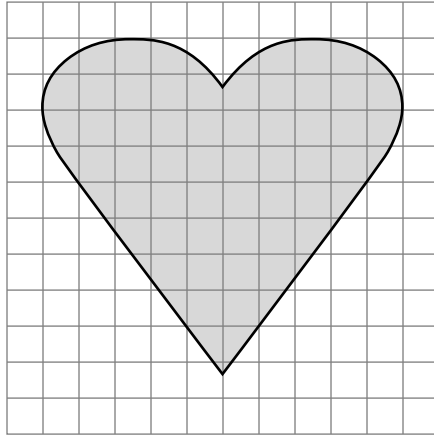
D. \$0.64



- 12.** A company is printing 250 calendars. In 1 hour, 75 calendars are printed. What percent of the calendars are printed in 1 hour?
- A.** 3%
  - B.** 3.3%
  - C.** 30%
  - D.** 33%
- 

- 13.** The surface area of a cube is 384 square inches. What is the volume of the cube?
- A.** 8 cubic inches
  - B.** 16 cubic inches
  - C.** 256 cubic inches
  - D.** 512 cubic inches

**14.** A heart shape is cut from a gridded piece of paper.



2

What is the approximate area of the heart?

- A.** 50 square units
- B.** 70 square units
- C.** 90 square units
- D.** 144 square units

---

**15.** Joleen bought 12 apples. Each apple weighed 1.8 ounces. How many pounds of apples did Joleen buy?

- A.** 1.35 pounds
- B.** 2.4 pounds
- C.** 21.6 pounds
- D.** 28.8 pounds

**Please fill in the grid with your answer to question 16 on page 2 of your answer document.**

- 16.** Eli has a cube with sides numbered 1–6 and a spinner with 3 equal sections labeled A, B, and C. He rolls the cube and spins the spinner. How many outcomes are possible?
- 

- 17.** Four students each flipped a coin 50 times and recorded the results in the table.

<b>Student</b>	<b>Heads</b>	<b>Tails</b>
Mai Ka	31	19
Heather	15	35
Jose	21	29
Tyrone	20	30

Who had a relative frequency of  $\frac{3}{5}$  of flipping tails?

- A.** Mai Ka
- B.** Heather
- C.** Jose
- D.** Tyrone

18. Which is equivalent to 0.04%?

- A.  $\frac{1}{4}$
- B.  $\frac{1}{25}$
- C.  $\frac{1}{400}$
- D.  $\frac{1}{2,500}$

19. What is the greatest common factor of 48 and 64?

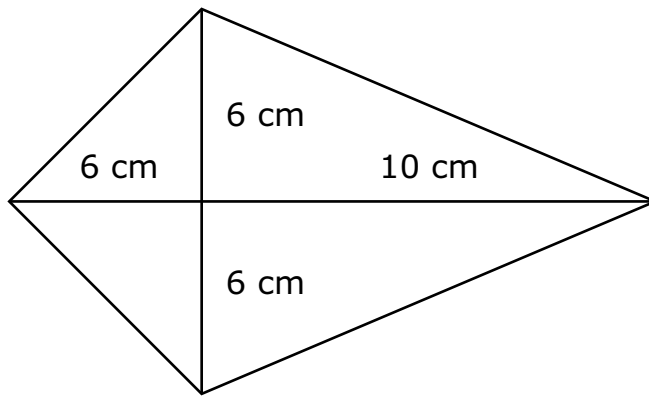
- A. 2
- B. 8
- C. 16
- D. 24

20. A paint color is made using 4 drops of red and 5 drops of blue for each 5 gallons of paint. How many gallons of paint are being colored when 45 drops of color are used?

- A. 9
- B. 25
- C. 45
- D. 81

- 21.** A phone company uses the equation  $y = 0.15x + 10$  to find  $y$ , the monthly charge for a customer sending  $x$  text messages. How many text messages are sent if the monthly charge is \$77.50?
- A.** 10
  - B.** 21
  - C.** 450
  - D.** 506

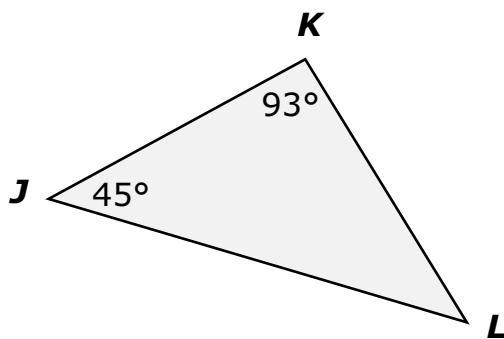
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- 22.** A scale drawing of a kite is shown.



What is the area of the kite?

- A.**  $28 \text{ cm}^2$
- B.**  $60 \text{ cm}^2$
- C.**  $96 \text{ cm}^2$
- D.**  $192 \text{ cm}^2$

23. A triangle is shown.

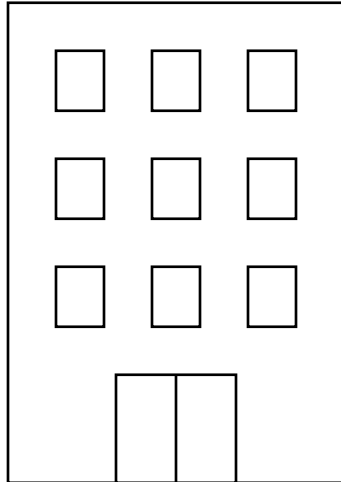


What is  $m\angle L$ ?

- A.  $42^\circ$
- B.  $45^\circ$
- C.  $48^\circ$
- D.  $138^\circ$

2

- 24.** A building has 9 windows. Each window is 5 feet tall.



About how tall is the building?

- A.** 30 feet
  - B.** 35 feet
  - C.** 40 feet
  - D.** 45 feet
- 
- 25.** Tyler has a stack of cards. He picks a card, records the color, and returns the card to the stack. He repeats this 60 times and chooses a red card 24 times. What is the experimental probability of choosing a red card from the stack?
- A.** 0.14
  - B.** 0.23
  - C.** 0.40
  - D.** 2.50

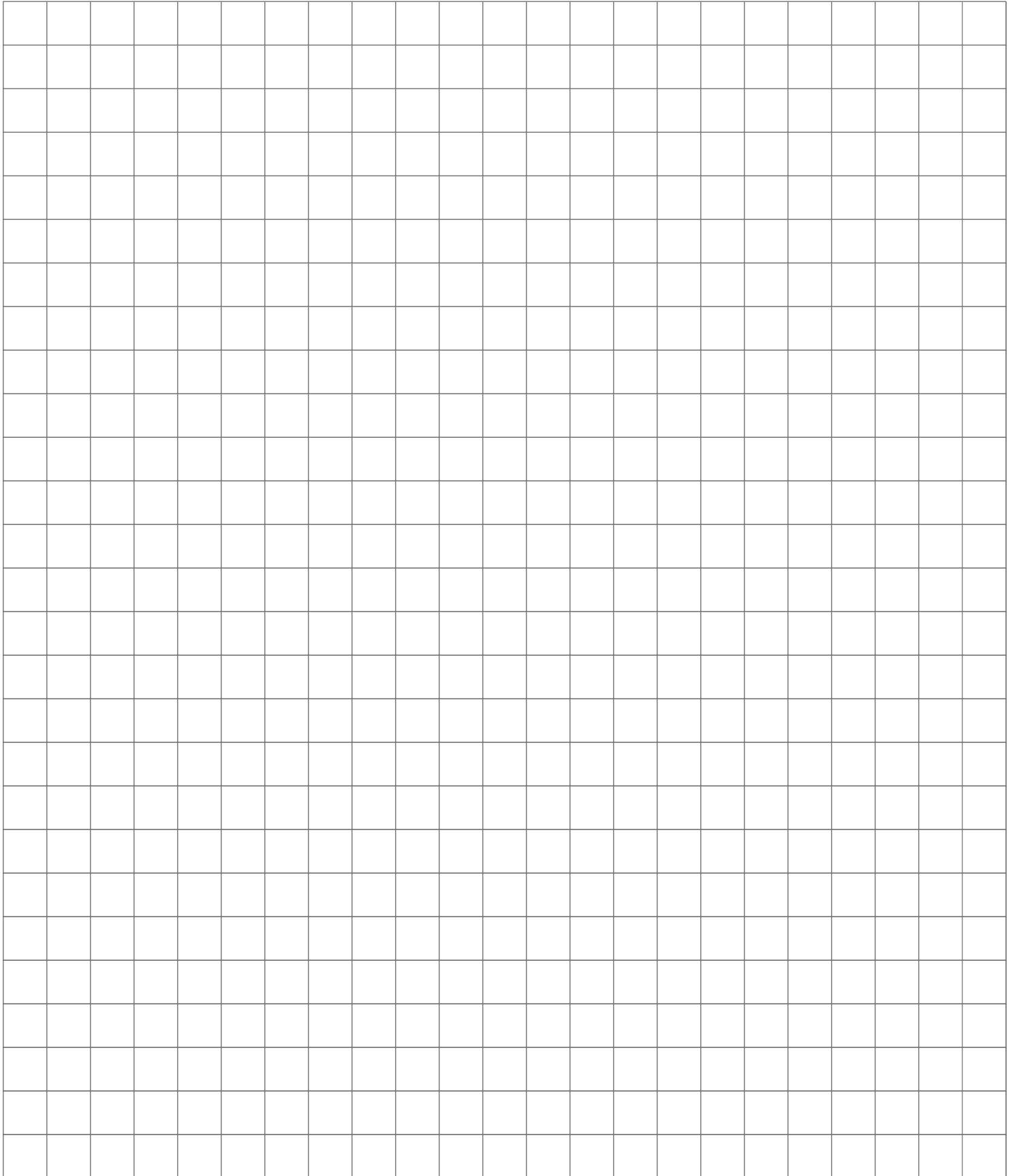
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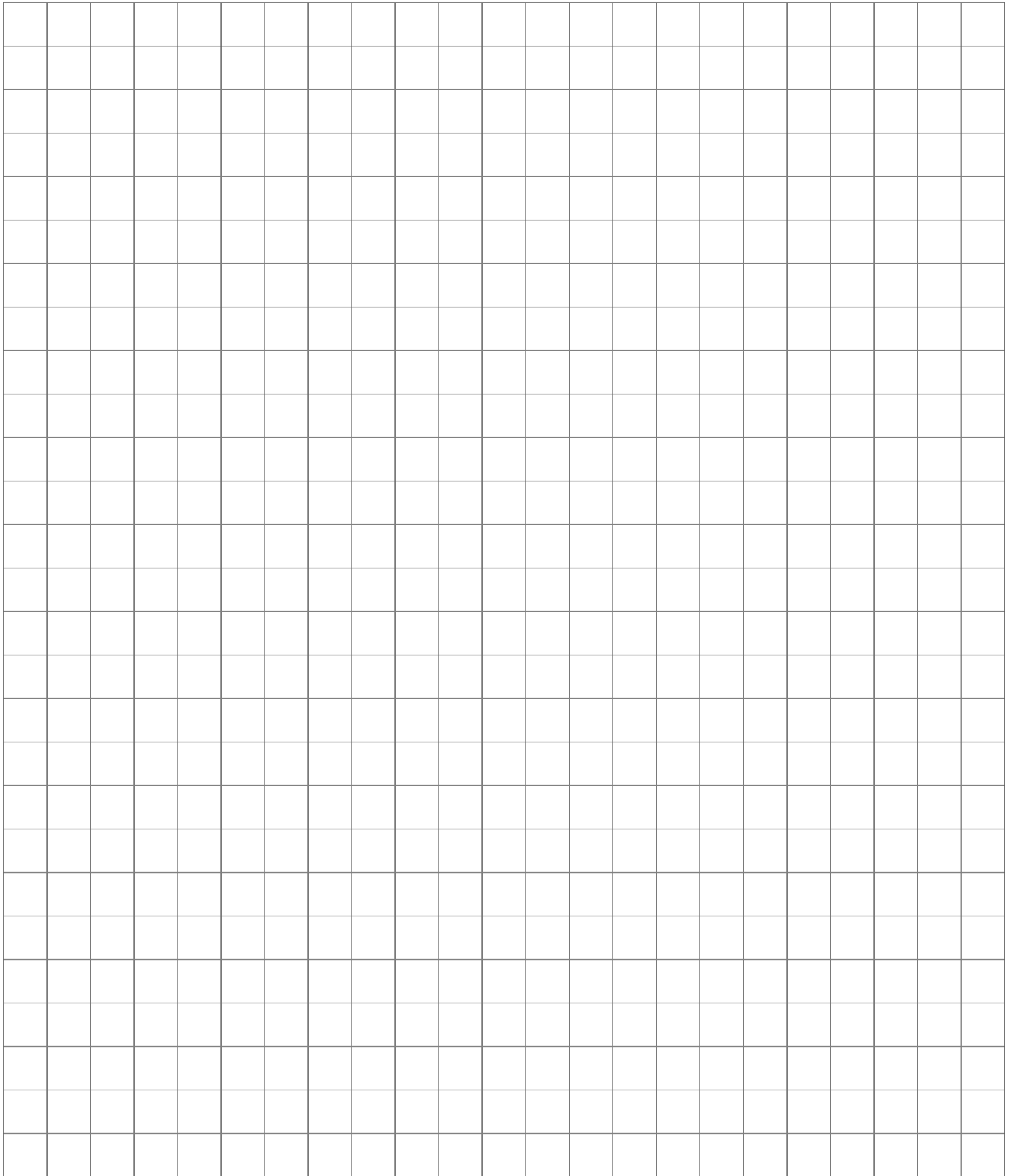
**This is the end of Segment 2.**

Check your work, then  
**SEAL** Segment 2.









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**MATHEMATICS  
ITEM SAMPLER**

Student Information page reflects the actual test. This Item Sampler may be reproduced.

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# Mathematics Test — Segment 1

- 1. (A) (B) (C) (D)
- 2. (A) (B) (C) (D)
- 3. (A) (B) (C) (D)

- 4. (A) (B) (C) (D)
- 5. (A) (B) (C) (D)
- 6. (A) (B) (C) (D)

- 7. (A) (B) (C) (D)
- 8. (A) (B) (C) (D)

# Mathematics Test — Segment 2

- 9. (A) (B) (C) (D)
- 10. (A) (B) (C) (D)
- 11. (A) (B) (C) (D)
- 12. (A) (B) (C) (D)
- 13. (A) (B) (C) (D)
- 14. (A) (B) (C) (D)
- 15. (A) (B) (C) (D)

16.

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4	4	4	4	4	
5	5	5	5	5	
6	6	6	6	6	
7	7	7	7	7	
8	8	8	8	8	
9	9	9	9	9	

- 17. (A) (B) (C) (D)
- 18. (A) (B) (C) (D)
- 19. (A) (B) (C) (D)
- 20. (A) (B) (C) (D)
- 21. (A) (B) (C) (D)
- 22. (A) (B) (C) (D)
- 23. (A) (B) (C) (D)
- 24. (A) (B) (C) (D)
- 25. (A) (B) (C) (D)



## MCA Item Sampler Teacher's Guide

[mde.testing@state.mn.us](mailto:mde.testing@state.mn.us)

### An Introduction to the MCA

The Minnesota Comprehensive Assessments are reading, mathematics and science tests that help schools and districts measure student progress toward the state's academic standards. In 2006, the reading and mathematics tests were aligned to the 2003 Minnesota Academic Standards and were named the Minnesota Comprehensive Assessment-Series II (MCA-II). The Science MCA-II became operational in 2008 and are aligned to the 2003 Minnesota Academic Standards. The grades 3–8 mathematics assessments will be operational in 2011 as the Minnesota Comprehensive Assessments-Series III (MCA-III) and are aligned to the 2007 Minnesota Academic Standards.

### The Purpose of the MCA Item Samplers

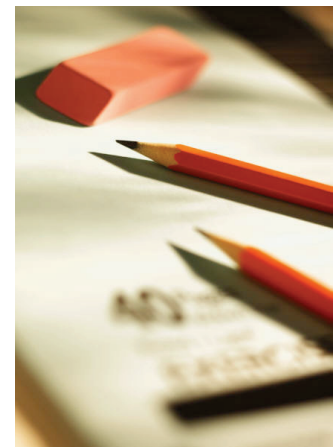
An item sampler is not a complete test. It contains a smaller number of the items that students will see on a full-length test in the spring. The MCA Item Samplers were developed to familiarize students and teachers with the format of the MCA and the kinds of items that will appear on them.

This MCA Item Sampler is not a real test. It should not be used to predict how well students will do on the tests. However, students may feel more comfortable with the tests if they have reviewed the Item Samplers prior to the test.

### How the MCA Item Samplers Were Created

The Item Samplers mirror the format of the MCA. The student directions, segment layouts, and answer sheet each reflect the way the test will look in the spring, except that the Item Sampler is shorter than the actual test. As with all MCAs, the reading passages and the math and reading questions have been thoroughly reviewed by Minnesota teachers prior to testing. Minnesota students have answered these questions on previous tests.

The distribution of question types and their aligned content selected for the Item Sampler generally reflects a range of items from each strand in the Minnesota Academic Standards. Whenever possible, the Item Samplers have the following designs:



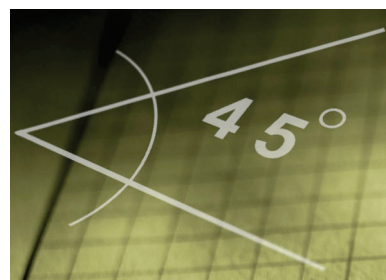
# Grade 6 Teacher's Guide

## Math:

- Two segments
  - Segment One does not allow a student to use a calculator.
  - The actual MCA has four segments
- Approximately twenty-four multiple-choice items
- One gridded-response item
- Formula sheet

## The Contents of This Teacher's Guide

The Answer Key identifies the answers and solutions to the questions. It also identifies the strand/sub-strand/benchmark from the Minnesota Academic Standards for the question.



## State Standards & Test Specifications

The Item Samplers are primarily intended to familiarize teachers and students with the **format** of the MCA. The best preparation for the **content** of the MCA is done as a part of your curriculum planning. When doing that, reference the Minnesota Academic Standards and the test specifications for the MCA. For further questions about the MCA, email us at [mde.testing@state.mn.us](mailto:mde.testing@state.mn.us).

# Grade 6 Teacher's Guide

## Mathematics MCA Item Sampler Answer Key Grade 6 Math

Item #	Correct Answer	Item Type	Strand	Standard	Benchmark
1	C	MC	1	1	07
2	A	MC	1	3	01
3	C	MC	1	1	03
4	B	MC	1	1	05
5	D	MC	2	1	01
6	D	MC	2	1	02
7	C	MC	2	2	01
8	C	MC	3	2	01
9	D	MC	1	1	02
10	C	MC	1	2	01
11	A	MC	1	2	03
12	C	MC	1	3	03
13	D	MC	3	1	01
14	A	MC	3	1	03
15	A	MC	3	3	01
16	Grid	GR	4	1	01
17	D	MC	4	1	03
18	D	MC	1	1	04
19	C	MC	1	1	06
20	B	MC	1	2	02
21	C	MC	2	3	02
22	C	MC	3	1	02
23	A	MC	3	2	02
24	C	MC	3	3	02
25	C	MC	4	1	04

## Grade 6 Teacher's Guide

**Item #** — The number of the question in the Item Sampler.

**Correction Answer** — Answers to multiple-choice questions are listed.

**Item Type** — Multiple Choice (**MC**), or Gridded Response (**GR**)

**Calculator Designation** — **CL** indicated that a calculator can be used on this item, **NC** indicates a student cannot use a calculator.

**Strand** — In mathematics, the MCA-III measures four strands:

1. Number and Operation
2. Algebra
3. Geometry and Measurement
4. Data Analysis and Probability

**Standard** — Each strand has one or more standards

**Benchmark** — Each standard has one or more benchmarks. See the Academic Standards or test specification for further explanation of each benchmark.

**Cognitive Level** — The level of cognitive demand focuses on the type and level of thinking and reasoning required of the student on a particular item. MCA-III and MCA-Modified levels of cognitive complexity are based on Norman L. Webb's Depth of Knowledge levels. See the test specifications for further explanation.

- Level 1: Recall
- Level 2: Skills/Concept
- Level 3: Strategic Thinking



# MCA-III Item Sampler

## Sample Gridded Responses

### Grade 6 Mathematics

Question 16 from page 19

16.

\$	/	/	/		%
•	•	•	•	•	
0	0	0	0	0	
1	1	1	●	1	
2	2	2	2	2	
3	3	3	3	3	
4	4	4	4	4	
5	5	5	5	5	
6	6	6	6	6	
7	7	7	7	7	
8	8	8	8	●	
9	9	9	9	9	

16.

\$	/	/	/		%
•	•	•	•	•	
0	0	0	0	0	
1	●	1	1	1	
2	2	2	2	2	
3	3	3	3	3	
4	4	4	4	4	
5	5	5	5	5	
6	6	6	6	6	
7	7	7	7	7	
8	8	●	8	8	
9	9	9	9	9	

16.

\$	/	/	/		%
•	•	•	●	•	
0	0	0	0	●	
1	●	1	1	1	
2	2	2	2	2	
3	3	3	3	3	
4	4	4	4	4	
5	5	5	5	5	
6	6	6	6	6	
7	7	7	7	7	
8	8	●	8	8	
9	9	9	9	9	

16.

\$	/	/	/		%
•	•	●	•	•	
0	0	0	●	●	
1	●	1	1	1	
2	2	2	2	2	
3	3	3	3	3	
4	4	4	4	4	
5	5	5	5	5	
6	6	6	6	6	
7	7	7	7	7	
8	●	8	8	8	
9	9	9	9	9	

**Note:** the sample grids above demonstrate multiple ways to correctly solve the same problem.

