
IX. Mathematics, Grade 3

Grade 3 Mathematics Test

The spring 2007 grade 3 MCAS Mathematics test was based on learning standards in the Massachusetts *Mathematics Curriculum Framework* (2000). The *Framework* identifies five major content strands, listed below. Specific learning standards for grade 3 are found in the *Supplement to the Massachusetts Mathematics Curriculum Framework* (2004). Page numbers for the grades 3–4 *Framework* learning standards and for the grade 3 *Supplement* standards appear in parentheses.

- Number Sense and Operations (*Framework*, pages 22–23; *Supplement*, pages 3–4)
- Patterns, Relations, and Algebra (*Framework*, page 32; *Supplement*, page 4)
- Geometry (*Framework*, page 40; *Supplement*, pages 4–5)
- Measurement (*Framework*, page 48; *Supplement*, page 5)
- Data Analysis, Statistics, and Probability (*Framework*, page 56; *Supplement*, pages 5–6)

The *Mathematics Curriculum Framework* and *Supplement* are available on the Department Web site at www.doe.mass.edu/frameworks/current.html.

In *Test Item Analysis Reports* and on the Subject Area Subscore pages of the *MCAS School Reports* and *District Reports*, Mathematics test results are reported under five MCAS reporting categories, which are identical to the five *Framework* content strands listed above.

Test Sessions

The MCAS grade 3 Mathematics test included two separate test sessions. Each session included multiple-choice, short-answer, and open-response questions.

Reference Materials and Tools

Each student taking the grade 3 Mathematics test was provided with a plastic ruler and a grade 3 Mathematics Tool Kit. A copy of the tool kit follows the final question in this chapter. An image of the ruler is not reproduced in this publication.

The use of bilingual word-to-word dictionaries was allowed for current and former limited English proficient students only, during both Mathematics test sessions. No calculators, other reference tools, or materials were allowed.

Cross-Reference Information

The table at the conclusion of this chapter indicates each item's reporting category and the *Framework* learning standard it assesses. The correct answers for multiple-choice and short-answer questions are also displayed in the table.

Mathematics

SESSION 1

You may use your tool kit and MCAS ruler during this session.
You may **not** use a calculator during this session.



DIRECTIONS

This session contains twelve multiple-choice questions, two short-answer questions, and two open-response questions. For multiple-choice questions, mark your answers by filling in the circle next to the best answer. For the short-answer and open-response questions, write your answer in the space provided below the question.

- 1 Ms. Mackey wrote the number pattern below using the rule “subtract 8.”

187, 179, 171, __?__, 155, 147, 139

What is the missing number in Ms. Mackey’s pattern?

- (A) 163
- (B) 168
- (C) 170
- (D) 177

- 2 The table below shows how many books three classes read.

Books Read

Class	Number of Books
Ms. Potter	1023
Ms. Hogan	?
Mr. Garcia	1067

Ms. Hogan’s class read **more** books than Ms. Potter’s class and **fewer** books than Mr. Garcia’s class.

Which of these could be the number of books Ms. Hogan’s class read?

- (A) 1074
- (B) 1166
- (C) 1005
- (D) 1062

3 What is 972 rounded to the nearest ten?

- (A) 900
- (B) 970
- (C) 980
- (D) 1000

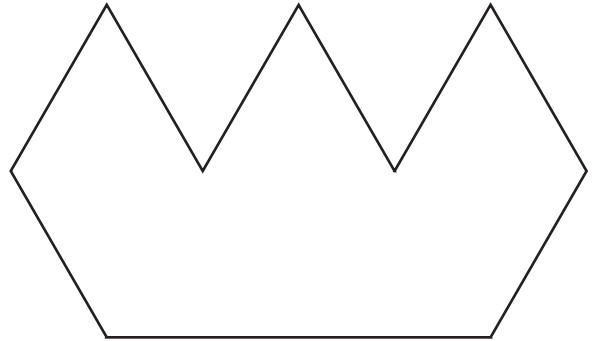
4 Neva has 16 pencils in her desk. Tracy has 8 pencils in her desk.

Which number sentence can be used to find how many more pencils Neva has than Tracy?

- (A) $8 - 16 = \square$
- (B) $8 + 16 = \square$
- (C) $16 + 8 = \square$
- (D) $16 - 8 = \square$

Use shapes R, T, and Z from your tool kit to answer question 5.

5 Which set of four shapes could you use to make the figure below?



- (A) R, R, T, Z
- (B) R, R, R, Z
- (C) R, R, Z, Z
- (D) R, R, T, T

Question 6 is a short-answer question. Write your answer to this question in the Answer Box provided.

- 6 Mr. Wilson's class made the chart below to show the number of birds that ate at a bird feeder on five days.

Birds That Ate at the Bird Feeder

Day	Number of Birds
Monday	8
Tuesday	18
Wednesday	30
Thursday	12
Friday	20

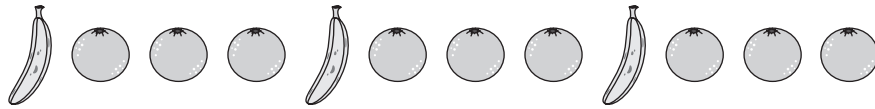
How many **more** birds ate at the bird feeder on Wednesday than on Monday? Write your answer in the Answer Box below.

Answer Box

6

Write your answer to open-response question 7 in the space provided.

- 7 Zoey is using bananas and oranges to make the pattern shown below. The rule for her pattern is ABBB.



Zoey will follow the rule for her pattern a total of 4 times.

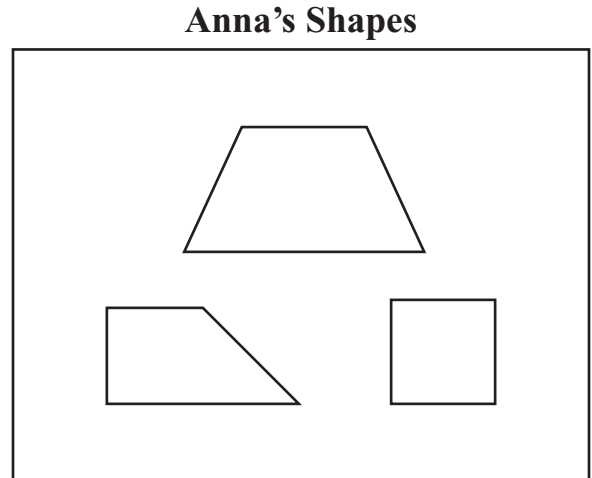
How many **oranges** will Zoey use in all? Show or explain how you got your answer.

Mark your choices for multiple-choice questions 8 through 12 by filling in the circle next to the best answer.

8 Which unit can Sara use to measure the height of the snow in her backyard?

- (A) gallon
- (B) pound
- (C) inch
- (D) ounce

9 Anna has the shapes shown in the box below.



Which sentence best describes Anna's shapes?

- (A) Each shape has all sides of equal length.
- (B) Each shape has one line of symmetry.
- (C) Each shape has four right angles.
- (D) Each shape has four corners.

- 10 Which symbol belongs in the circle below to make a true number sentence?

$$7 \times 7 \bigcirc 34 + 13$$

- (A) >
- (B) -
- (C) <
- (D) =

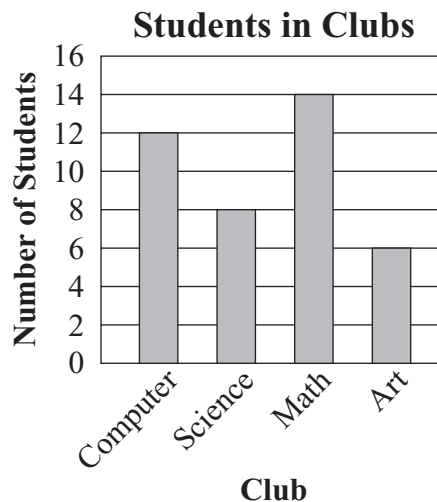
- 11 Maria is thinking of a number. The clues for her number are shown below.

- It is a multiple of 5.
- It is an even number.
- It is less than 18.

Which of these could be Maria's number?

- (A) 5
- (B) 20
- (C) 8
- (D) 10

- 12 The bar graph below shows the number of students who belong to each club at Patterson School.

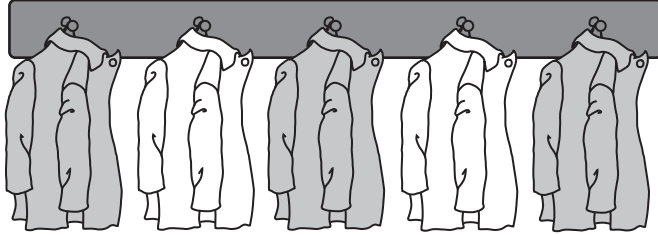


How many **more** students belong to the Math Club than to the Art Club?

- (A) 4
- (B) 6
- (C) 8
- (D) 14

Question 13 is a short-answer question. Write your answer to this question in the Answer Box provided.

- 13 The coats shown below are hanging on coat hooks.



What fraction of the coats are white?

Write your answer in the Answer Box below.

Answer Box

13

Mark your choices for multiple-choice questions 14 and 15 by filling in the circle next to the best answer.

- 14 Brianna bought 4 shirts. Each shirt cost \$8.95.
Which estimate is closest to the total cost of the shirts that Brianna bought?

- | | |
|---|------|
| Ⓐ | \$32 |
| Ⓑ | \$36 |
| Ⓒ | \$38 |
| Ⓓ | \$40 |

- 15 Oliver asked his classmates to vote for their favorite cookie. The tally chart below shows their votes.

Favorite Cookies

Cookie	Number of Classmates
peanut butter	
chocolate chip	
oatmeal	

Which pictograph correctly shows their votes?

Favorite Cookies

(A)

Cookie	Number of Classmates
peanut butter	☺☺☺☺
chocolate chip	☺☺☺
oatmeal	☺☺

Key
☺ stands for 2 classmates

Favorite Cookies

(C)

Cookie	Number of Classmates
peanut butter	☺☺☺☺☺
chocolate chip	☺☺☺☺☺☺☺
oatmeal	☺☺☺☺

Key
☺ stands for 2 classmates

Favorite Cookies

(B)

Cookie	Number of Classmates
peanut butter	☺☺☺☺☺☺
chocolate chip	☺☺☺☺☺☺☺☺
oatmeal	☺☺☺☺

Key
☺ stands for 2 classmates

Favorite Cookies

(D)

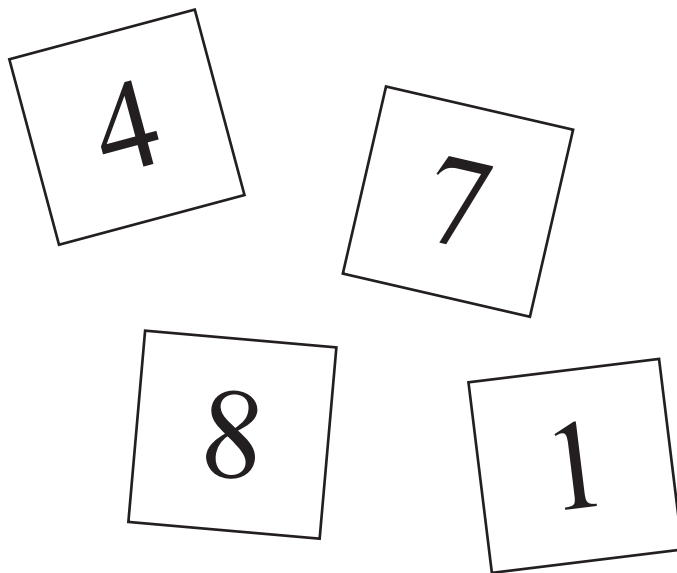
Cookie	Number of Classmates
peanut butter	☺☺☺
chocolate chip	☺☺☺☺
oatmeal	☺☺

Key
☺ stands for 2 classmates

Write your answers to parts (a) and (b) of open-response question 16 in the spaces provided.

Use the number tiles from your tool kit to answer question 16.

16 Alan has the number tiles shown below.



a. Use all of Alan’s number tiles to make the four-digit number with the **smallest** value. Use each number tile only one time. Write the number in the boxes below.

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b. What is the value of the digit 7 in the number you made? Explain your answer.

Mathematics

SESSION 2

You may use your tool kit and MCAS ruler during this session.
You may **not** use a calculator during this session.



DIRECTIONS

This session contains thirteen multiple-choice questions, three short-answer questions, and three open-response questions. For multiple-choice questions, mark your answers by filling in the circle next to the best answer. For the short-answer and open-response questions, write your answer in the space provided below the question.

- 17 The tally chart below shows the favorite lunches of some students.

Favorite Lunches

Lunch	Number of Students
Taco	
Chicken	
Spaghetti	
Hamburger	
Pizza	

Which two lunches were the favorites of the same number of students?

- (A) taco and spaghetti
- (B) taco and hamburger
- (C) spaghetti and hamburger
- (D) spaghetti and pizza

- 18 Missy wants to put 12 stickers on her paper.

What is one way that she can put 12 stickers on her paper?

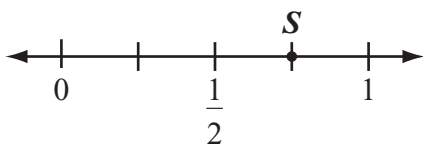
- (A) 3 rows of 3 stickers
- (B) 3 rows of 6 stickers
- (C) 4 rows of 2 stickers
- (D) 4 rows of 3 stickers

- 19 The Hamilton family drove 138 miles. The Jefferson family drove 206 miles.

Which of these correctly compares the number of miles each family drove?

- (A) $138 < 206$
- (B) $138 + 206$
- (C) $138 = 206$
- (D) $138 > 206$

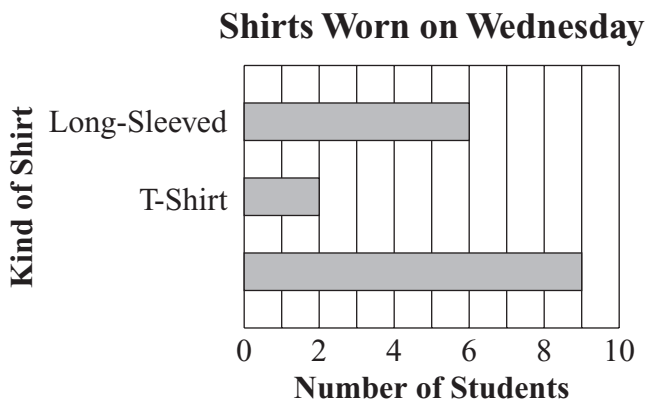
- 20 Point S is shown on the number line below.



Which fraction best names point S on the number line?

- (A) $\frac{1}{4}$
- (B) $\frac{2}{3}$
- (C) $\frac{3}{4}$
- (D) $\frac{3}{2}$

- 21 Anne made the graph below to show the kinds of shirts worn by her classmates on Wednesday.



What information is missing from Anne's graph?

- (A) the kind of shirt worn by 9 students
- (B) the kind of shirt worn by 2 students
- (C) the number of students who wore T-shirts
- (D) the number of students who wore long-sleeved shirts

Question 22 is a short-answer question. Write your answer to this question in the Answer Box provided.

22 Compute:

$$\begin{array}{r} 83 \\ \times 4 \\ \hline \end{array}$$

Write your answer in the Answer Box below.

Answer Box

22

Write your answers to parts (a) and (b) of open-response question 23 in the spaces provided.

- 23** The clock below shows the time that Mr. Stone put a cake in the oven.



- a. The cake needs to bake for 30 minutes.

At what time will the cake be done?

- b. Mr. Stone also wants to bake rolls. The rolls only need to bake for 10 minutes.

At what time should Mr. Stone put the rolls in the oven so that they will be done at exactly the same time as the cake?

Mark your choices for multiple-choice questions 24 through 28 by filling in the circle next to the best answer.

- 24 The table below shows how many coins each child in the Jones family has.

Children's Coins

Child	Coins
Byron	3 quarters
Pam	100 pennies
Linda	4 quarters
William	50 pennies

Which two children have the same amount of money?

- (A) Linda and William
- (B) Pam and William
- (C) Byron and Pam
- (D) Pam and Linda

- 25 Jenny collected 10 seashells. She collected 2 times as many seashells as Beth collected.

How many seashells did Beth collect?






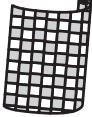
- (A) 5
- (B) 8
- (C) 12
- (D) 20

- 26 Which number sentence is true?

- (A) $5 + 0 = 5 \times 1$
- (B) $5 + 1 = 5 \times 1$
- (C) $5 + 0 = 5 \times 0$
- (D) $5 + 1 = 5 \times 0$

- 27 Mandy is going to wrap a gift. The kinds of wrapping paper and bows she can choose are shown below.

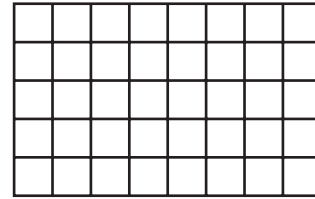
Gift Wrap

Kinds of Wrapping Paper	Kinds of Bows
	
	
	
	

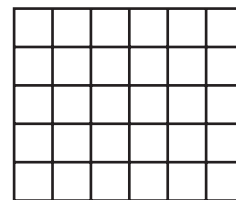
How many different ways can Mandy choose 1 kind of wrapping paper and 1 kind of bow?

- (A) 2
- (B) 4
- (C) 6
- (D) 8

- 28 Models of Room 1 and Room 2 are shown below. Each room is shaped like a rectangle.



Room 1



Room 2

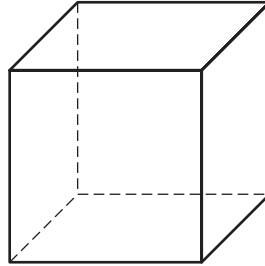
 stands for 1 square foot

How many square feet larger is the area of Room 1 than the area of Room 2?

- (A) 2 square feet
- (B) 4 square feet
- (C) 8 square feet
- (D) 10 square feet

Question 29 is a short-answer question. Write your answer to this question in the Answer Box provided.

- 29 A cube is shown below.



How many corners does a cube have? Write your answer in the Answer Box below.

Answer Box

29

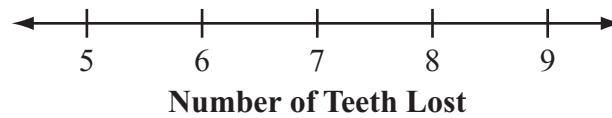
Write your answer to open-response question 30 in the space provided below.

- 30 Noah asked eight of his friends, “How many teeth have you lost?” The chart below shows their answers.

Number of Teeth Lost

Name of Friend	Number of Teeth Lost
Alex	6
Jennifer	8
Kyle	7
Cody	5
Amanda	8
Sammy	7
Dan	9
Sarah	8

Noah started to make the line plot below to show the data from his chart. Put Xs above the correct numbers to complete the line plot.



Mark your choices for multiple-choice questions 31 through 33 by filling in the circle next to the best answer.

- 31 Which symbol belongs in the circle below to make the number sentence true?

$$45 \div 9 \bigcirc 35 \div 7$$

- (A) <
- (B) =
- (C) >
- (D) +

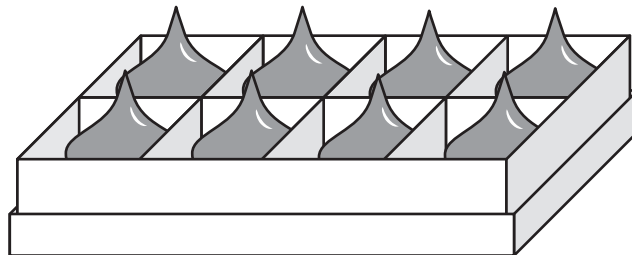
- 32 Candace wrote the number sentence below.

$$15 \div 3 = \square$$

Which of these is another way to write Candace's number sentence?

- (A) $15 + \square = 3$
- (B) $15 \times \square = 3$
- (C) $3 + \square = 15$
- (D) $3 \times \square = 15$

- 33 Marta and Nate had the box of 8 candies shown below.



Marta ate $\frac{5}{8}$ of the candies. Nate ate $\frac{2}{8}$ of the candies. Altogether, what fraction of the box of candies did they eat?

- (A) $\frac{3}{8}$
- (B) $\frac{7}{8}$
- (C) $\frac{3}{16}$
- (D) $\frac{7}{16}$

Question 34 is a short-answer question. Write your answer to this question in the Answer Box provided.

- 34 Cindy wrote the number sentence below.

$$\boxed{?} \times 3 = 24$$

In the Answer Box below, write the missing number that makes Cindy's number sentence true.

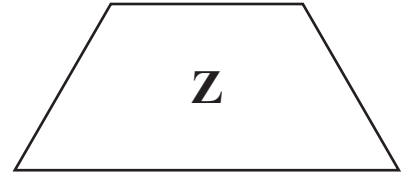
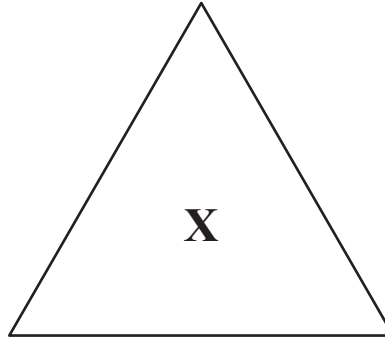
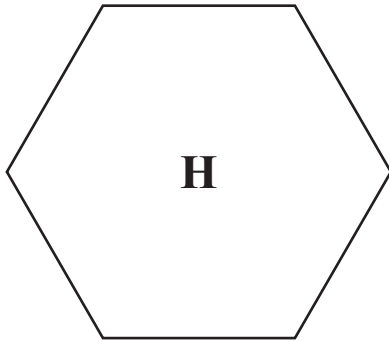
Answer Box

34

Write your answers to parts (a) and (b) of open-response question 35 in the spaces provided.

Use shapes H, X, and Z from your tool kit to answer question 35.

35 Ravi is using the shapes shown below to learn about symmetry.

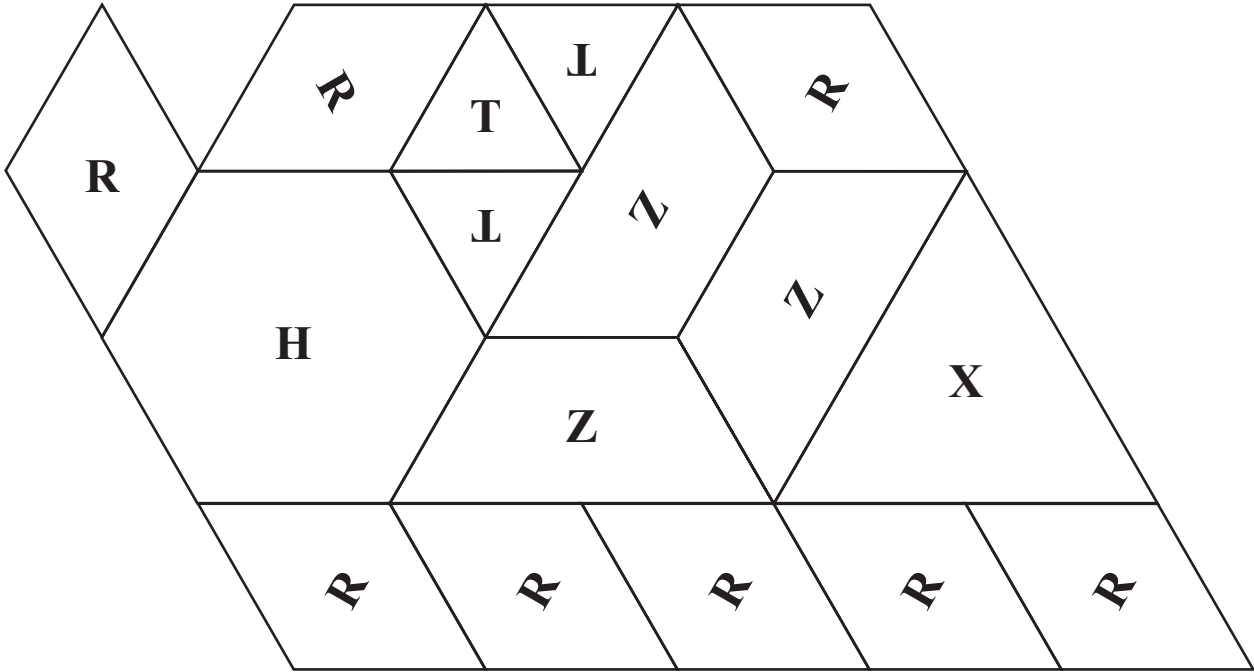


a. In the space below, trace the shape that has **only one** line of symmetry.

b. Draw the line of symmetry onto the shape you traced in part (a).

Massachusetts Comprehensive Assessment System

Grade 3 Mathematics Tool Kit



0	1	2	3	4
5	6	7	8	9

Grade 3 Mathematics
Spring 2007 Released Items:
Reporting Categories, Standards, and Correct Answers

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC/SA)*
1	229	<i>Patterns, Relations, and Algebra</i>	3.P.1	A
2	229	<i>Number Sense and Operations</i>	3.N.2	D
3	230	<i>Number Sense and Operations</i>	3.N.11	B
4	230	<i>Patterns, Relations, and Algebra</i>	3.P.4	D
5	230	<i>Geometry</i>	3.G.7	A
6	231	<i>Data Analysis, Statistics, and Probability</i>	3.D.3	22
7	232	<i>Patterns, Relations, and Algebra</i>	3.P.1	
8	233	<i>Measurement</i>	3.M.1	C
9	233	<i>Geometry</i>	3.G.1	D
10	234	<i>Patterns, Relations, and Algebra</i>	3.P.2	A
11	234	<i>Number Sense and Operations</i>	3.N.5	D
12	234	<i>Data Analysis, Statistics, and Probability</i>	3.D.3	C
13	235	<i>Number Sense and Operations</i>	3.N.3	$\frac{2}{5}$
14	236	<i>Number Sense and Operations</i>	3.N.12	B
15	237	<i>Data Analysis, Statistics, and Probability</i>	3.D.2	D
16	238	<i>Number Sense and Operations</i>	3.N.1	
17	239	<i>Data Analysis, Statistics, and Probability</i>	3.D.3	B
18	239	<i>Number Sense and Operations</i>	3.N.9	D
19	239	<i>Patterns, Relations, and Algebra</i>	3.P.4	A
20	240	<i>Number Sense and Operations</i>	3.N.4	C
21	240	<i>Data Analysis, Statistics, and Probability</i>	3.D.1	A
22	241	<i>Number Sense and Operations</i>	3.N.10	332
23	242	<i>Measurement</i>	3.M.3	
24	243	<i>Measurement</i>	3.M.2	D
25	243	<i>Number Sense and Operations</i>	3.N.8	A
26	243	<i>Number Sense and Operations</i>	3.N.7	A
27	244	<i>Data Analysis, Statistics, and Probability</i>	3.D.4	D
28	244	<i>Measurement</i>	3.M.4	D
29	245	<i>Geometry</i>	3.G.2	8
30	246	<i>Data Analysis, Statistics, and Probability</i>	3.D.3	
31	247	<i>Patterns, Relations, and Algebra</i>	3.P.2	B
32	247	<i>Number Sense and Operations</i>	3.N.6	D
33	247	<i>Number Sense and Operations</i>	3.N.13	B
34	248	<i>Patterns, Relations, and Algebra</i>	3.P.3	8
35	249	<i>Geometry</i>	3.G.6	

* Answers are provided here for multiple-choice items and short-answer items only. Sample responses and scoring guidelines for open-response items, which are indicated by shaded cells, will be posted to the Department's Web site later this year.

