
X. Mathematics, Grade 4

Grade 4 Mathematics Test

The spring 2014 grade 4 Mathematics test was based on standards in the five domains for grade 4 in the *Massachusetts Curriculum Framework for Mathematics* (March 2011). The grade 4 standards can be found on pages 43–47 in the *Framework*, and the five domains are listed below.

- Operations and Algebraic Thinking
- Number and Operations in Base Ten
- Number and Operations—Fractions
- Measurement and Data
- Geometry

The *Massachusetts Curriculum Framework for Mathematics* is available on the Department website at www.doe.mass.edu/frameworks/current.html.

Mathematics test results are reported under five MCAS reporting categories, which are identical to the five framework domains listed above.

The tables at the conclusion of this chapter indicate each released and unreleased common item’s reporting category and the framework standard it assesses. The correct answers for released multiple-choice and short-answer questions are also displayed in the released item table.

Test Sessions

The grade 4 Mathematics test included two separate test sessions. Each session included multiple-choice, short-answer, and open-response questions. Approximately half of the common test items are shown on the following pages as they appeared in test booklets.

Reference Materials and Tools

Each student taking the grade 4 Mathematics test was provided with a plastic ruler and a grade 4 Mathematics Tool Kit. A copy of the tool kit piece used by students to answer question 13 immediately follows the last 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 English language learner students only, during both Mathematics test sessions. No calculators, other reference tools, or materials were allowed.

Grade 4 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 eight multiple-choice questions, one short-answer question, and two open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

- 1 Talia used 672 charms to make key chains for the school fair. She used 7 charms for each key chain she made.

What was the total number of key chains Talia made for the school fair?

- A. 86
- B. 87
- C. 96
- D. 97

- 2 A string is cut into 10 equal parts.

Which of the following shows two ways to represent 1 part of the string?

- A. $\frac{1}{10}$ and 0.10
- B. $\frac{1}{10}$ and 1.0
- C. $\frac{10}{10}$ and 10.0
- D. $\frac{10}{10}$ and 0.01

- 3 Makara wrote the equation shown below.

$$550 - 188 = \boxed{?}$$

What number belongs in the $\boxed{?}$ to make Makara's equation true?

- A. 362
- B. 372
- C. 378
- D. 438

Question 4 is a short-answer question. Write your answer to this question in the box provided in your Student Answer Booklet. Do not write your answer in this test booklet. You may do your figuring in the test booklet.

You may use your MCAS ruler to answer question 4.

- 4 In your Student Answer Booklet, draw a quadrilateral that is **not** a parallelogram.

Question 5 is an open-response question.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.**
- **Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.**
- **If you do the work in your head, explain in writing how you did the work.**

Write your answer to question 5 in the space provided in your Student Answer Booklet.

- 5 Jean put $\frac{1}{8}$ cup of yogurt on top of each bowl of fruit she made. She made 10 bowls of fruit.
- a. Write an expression that shows the amount, in cups, of yogurt that Jean put on all 10 bowls of fruit.
 - b. In your Student Answer Booklet, draw a fraction model to show the amount, in cups, of yogurt that Jean put on all 10 bowls of fruit.

Each bowl Jean made contained $\frac{3}{4}$ cup of fruit.

- c. What is the total number of cups of **fruit** in all 10 bowls Jean made? Write your answer as a mixed number. Show your work.

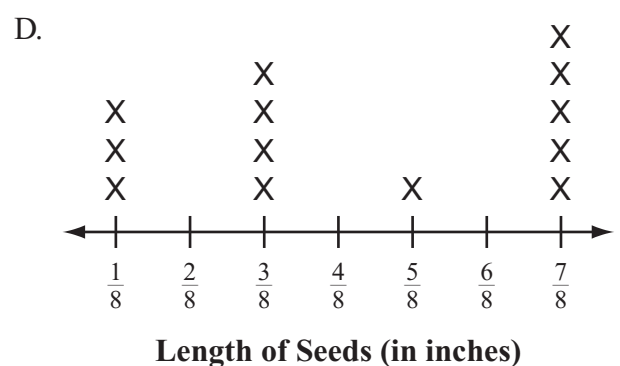
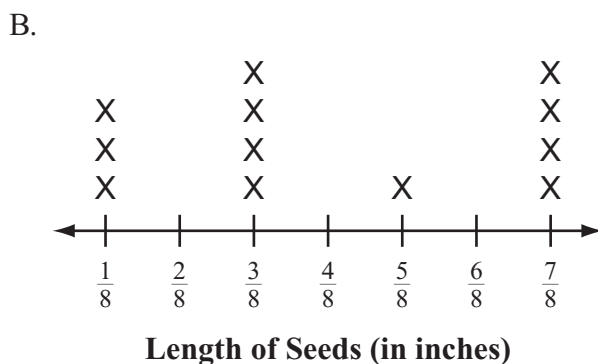
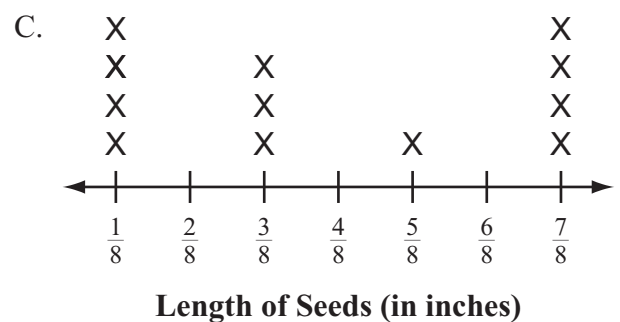
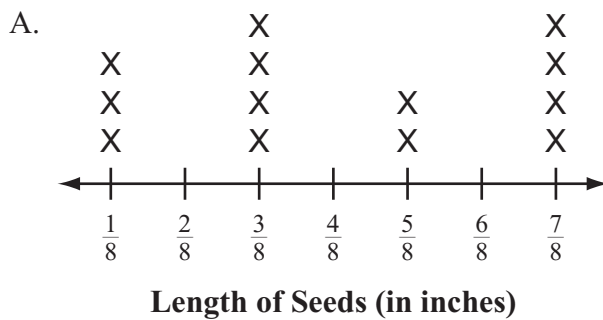
Mark your answers to multiple-choice questions 6 through 10 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

- 6 Andy measured the lengths of seeds from different plants. The lengths, in inches, of the seeds Andy measured are shown in the table below.

**Lengths of Seeds
(in inches)**

$\frac{7}{8}$	$\frac{3}{8}$	$\frac{1}{8}$	$\frac{7}{8}$
$\frac{3}{8}$	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
$\frac{5}{8}$	$\frac{7}{8}$	$\frac{7}{8}$	$\frac{1}{8}$

Which of these line plots correctly shows the information in the table?



7 Which of these is equivalent to 68,051?

- A. $6 + 8 + 0 + 5 + 1$
- B. $6,000 + 800 + 50 + 1$
- C. $60,000 + 8,000 + 50 + 1$
- D. $60,000 + 8,000 + 500 + 1$

8 Which of these equations shows that 63 is 9 times as many as 7?

- A. $9 + 7 = 16$
- B. $9 \times 7 = 63$
- C. $9 \div 63 = 7$
- D. $9 \times 63 = 7$

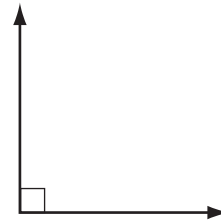
9 Lee wrote the equation shown below.

$$32 \times 27 = \boxed{?}$$

What number belongs in the $\boxed{?}$ to make Lee's equation true?

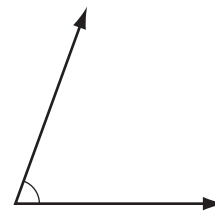
- A. 288
- B. 614
- C. 854
- D. 864

10 The angle below measures 90° .

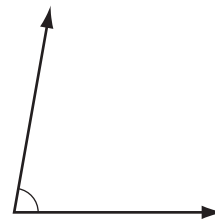


Which of the following angles measures about 100° ?

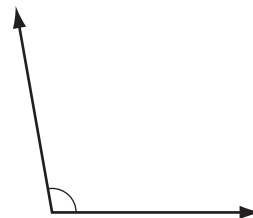
A.



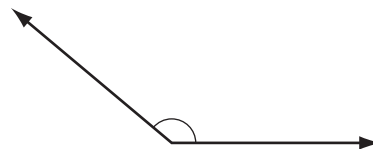
B.



C.



D.

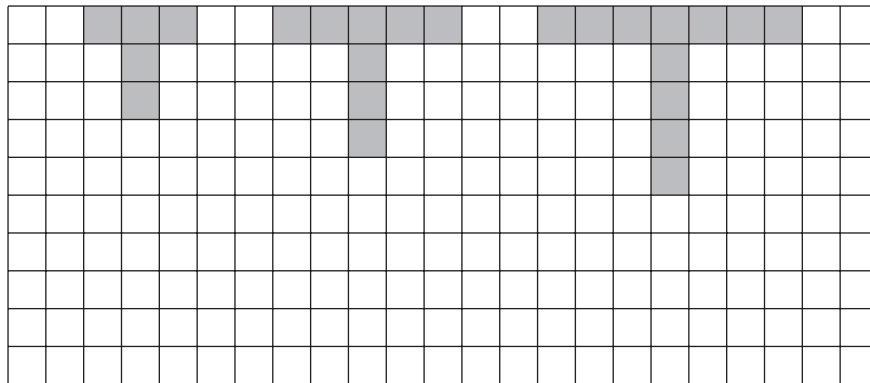


Question 11 is an open-response question.

- BE SURE TO ANSWER AND LABEL ALL PARTS OF THE QUESTION.
- Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.
- If you do the work in your head, explain in writing how you did the work.

Write your answer to question 11 in the space provided in your Student Answer Booklet.

- 11 Aaron shaded squares to make a pattern of T shapes, as shown below.



Aaron shaded 5 squares to make the first T. Then he shaded 3 more squares each time he made the next T in his pattern. Aaron continued his pattern.

- a. On the grid in your Student Answer Booklet, shade squares to make the fourth T in Aaron’s pattern.
- b. How many squares in all does Aaron need to shade to make the **sixth** T in his pattern? Show or explain how you got your answer.
- c. Will there be any T in Aaron’s pattern that has **exactly** 30 shaded squares? Show or explain how you got your answer.

Grade 4 Mathematics

SESSION 2

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

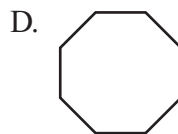
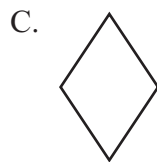
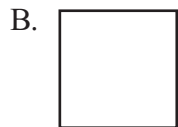


DIRECTIONS

This session contains eight multiple-choice questions and two short-answer questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

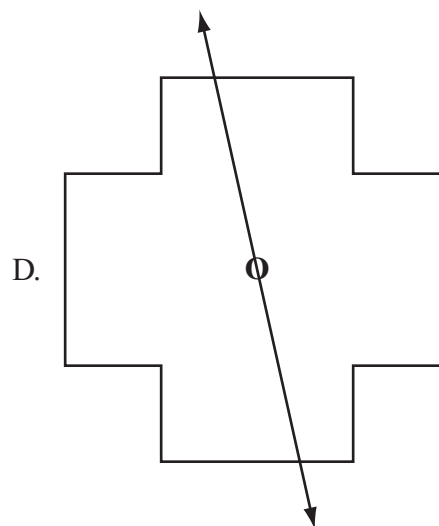
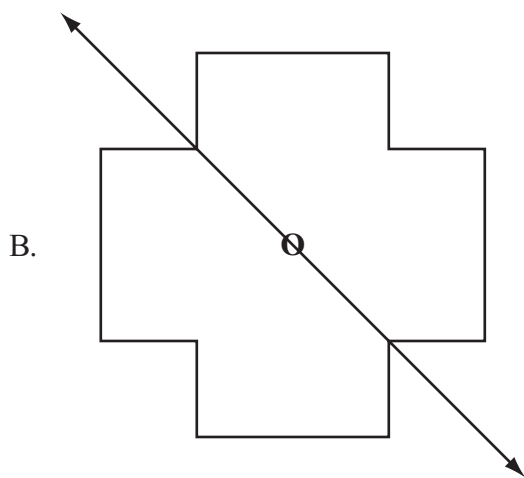
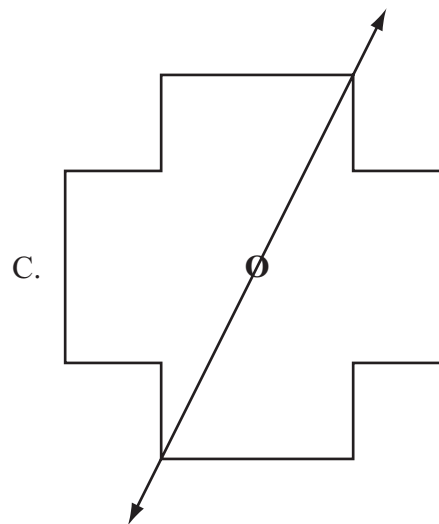
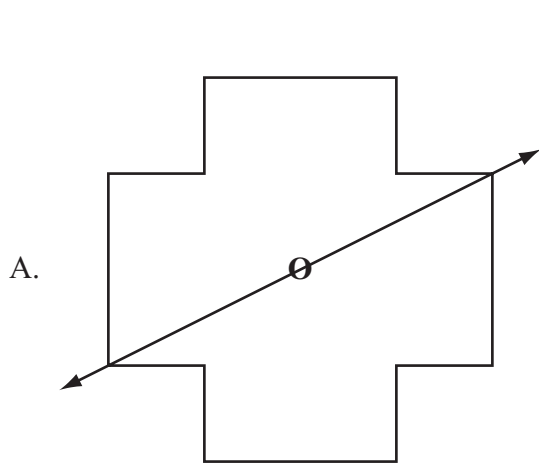
- 12 Cho drew a shape. The angles inside Cho's shape are **all** obtuse angles.

Which of the following could be the shape that Cho drew?



Use the shape labeled O from your tool kit to answer question 13.

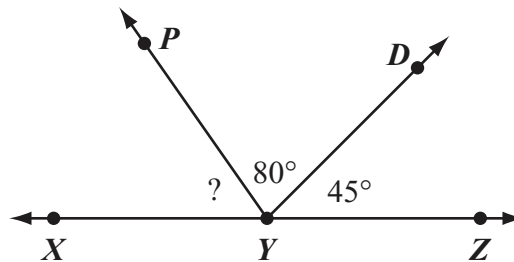
- 13 Which of these shows shape O with one of its lines of symmetry?



- 14 Corn muffins cost \$2 each. Blueberry muffins cost \$3 each.
- Which of the following equations can be used to find m , the total cost in dollars of 8 corn muffins and 7 blueberry muffins?

- A. $(2 + 3) \times (8 + 7) = m$
- B. $(2 \times 3) + (8 \times 7) = m$
- C. $(2 + 8) \times (3 + 7) = m$
- D. $(2 \times 8) + (3 \times 7) = m$

- 15 Angle XYZ is a 180° angle. Angle XYZ is divided into three smaller angles, as shown below.

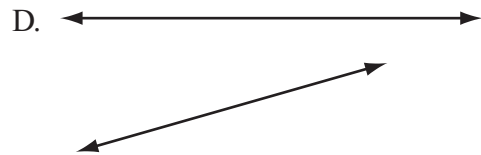
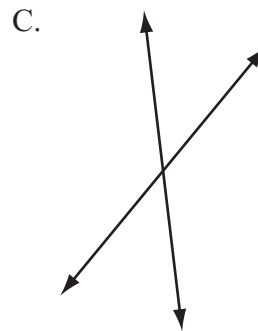
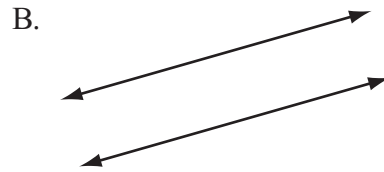
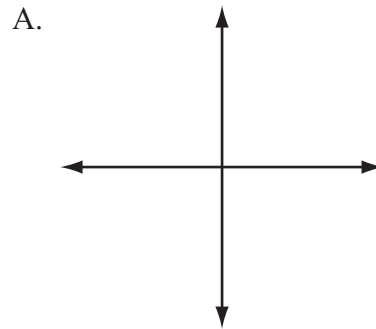


What is the measure of angle XYP ?

- A. 35°
- B. 45°
- C. 55°
- D. 125°

- 16 On Monday, it took Aliza 30 minutes to do her homework and 45 minutes to do her chores.
- What was the total amount of time Aliza spent doing homework and chores on Monday?
- A. 1 hour
 - B. 1 hour 15 minutes
 - C. 1 hour 30 minutes
 - D. 1 hour 45 minutes

- 17 Which of the following best represents a pair of perpendicular lines?



Questions 18 and 19 are short-answer questions. Write your answers to these questions in the boxes provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

- 18 Shanti has a pear that weighs 0.28 pound. Taylor has a pear that weighs 0.32 pound. Write a number sentence to compare the weights of the two pears. Use **one** of these symbols, $>$, $<$, or $=$, to compare the numbers in your number sentence.

- 19 Kiril's clues about a number are shown in the box below.

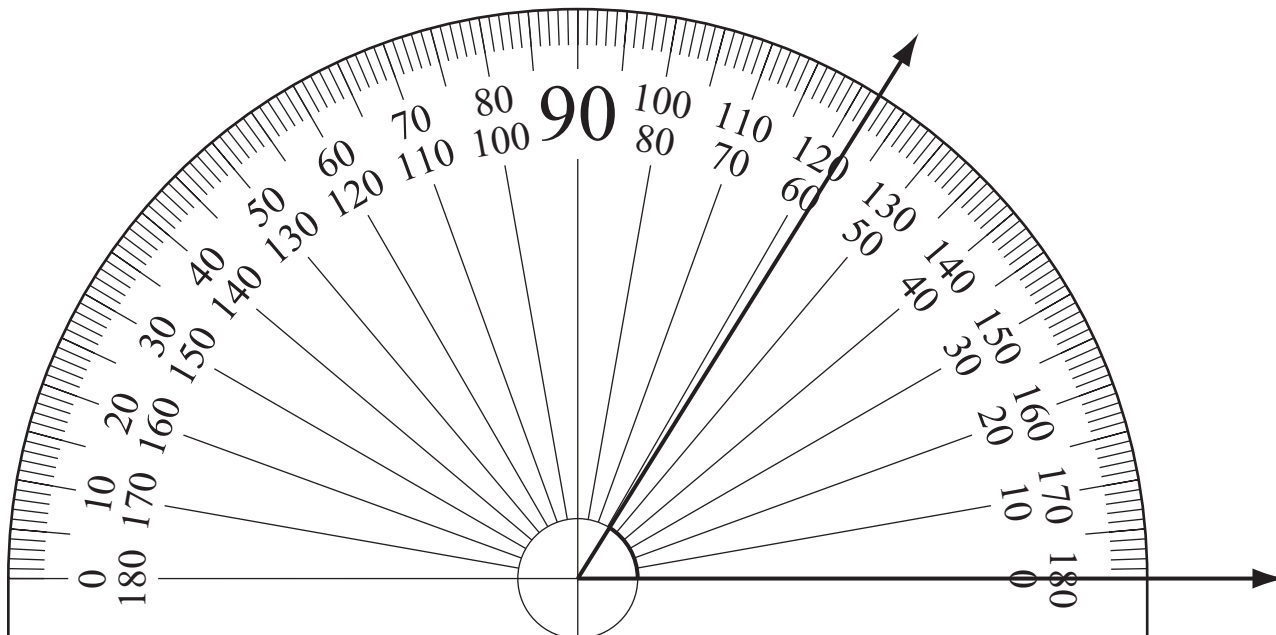
- It is an even number.
- It is a multiple of 5.
- It is less than 28.

Write a number that fits all of Kiril's clues.

Mark your answers to multiple-choice questions 20 and 21 in the spaces provided in your Student Answer Booklet. Do not write your answers in this test booklet. You may do your figuring in the test booklet.

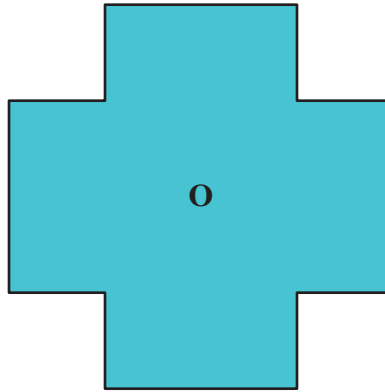
- 20 Which of these is true?
- A. $809 > 890$
 - B. $848 > 809$
 - C. $884 < 809$
 - D. $890 < 848$

21 An angle and a protractor are shown below.



What is the measure of the angle?

- A. 58°
- B. 62°
- C. 118°
- D. 122°



Grade 4 Mathematics
Spring 2014 Released Items:
Reporting Categories, Standards, and Correct Answers*

Item No.	Page No.	Reporting Category	Standard	Correct Answer (MC/SA)*
1	152	<i>Number and Operations in Base Ten</i>	NBT.6	C
2	152	<i>Number and Operations-Fractions</i>	NF.6	A
3	152	<i>Number and Operations in Base Ten</i>	NBT.4	A
4	153	<i>Geometry</i>	G.2	Any 4-sided shape that does not have 2 pairs of parallel sides
5	154	<i>Number and Operations-Fractions</i>	NF.4	
6	155	<i>Measurement and Data</i>	MD.4	B
7	156	<i>Number and Operations in Base Ten</i>	NBT.2	C
8	156	<i>Operations and Algebraic Thinking</i>	OA.1	B
9	156	<i>Number and Operations in Base Ten</i>	NBT.5	D
10	156	<i>Measurement and Data</i>	MD.5	C
11	157	<i>Operations and Algebraic Thinking</i>	OA.5	
12	158	<i>Geometry</i>	G.1	D
13	159	<i>Geometry</i>	G.3	B
14	160	<i>Operations and Algebraic Thinking</i>	OA.3	D
15	160	<i>Measurement and Data</i>	MD.7	C
16	161	<i>Measurement and Data</i>	MD.2	B
17	161	<i>Geometry</i>	G.1	A
18	162	<i>Number and Operations-Fractions</i>	NF.7	$0.28 < 0.32$ OR $0.32 > 0.28$
19	162	<i>Operations and Algebraic Thinking</i>	OA.4	10 or 20
20	163	<i>Number and Operations in Base Ten</i>	NBT.2	B
21	164	<i>Measurement and Data</i>	MD.6	A

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

Grade 4 Mathematics
Spring 2014 Unreleased Common Items:
Reporting Categories and Standards

Item No.	Reporting Category	Standard
22	<i>Operations and Algebraic Thinking</i>	OA.2
23	<i>Geometry</i>	G.1
24	<i>Measurement and Data</i>	MD.1
25	<i>Operations and Algebraic Thinking</i>	OA.4
26	<i>Number and Operations-Fractions</i>	NF.3
27	<i>Geometry</i>	G.3
28	<i>Number and Operations in Base Ten</i>	NBT.1
29	<i>Measurement and Data</i>	MD.2
30	<i>Operations and Algebraic Thinking</i>	OA.2
31	<i>Geometry</i>	G.2
32	<i>Operations and Algebraic Thinking</i>	OA.1
33	<i>Number and Operations-Fractions</i>	NF.2
34	<i>Number and Operations-Fractions</i>	NF.7
35	<i>Operations and Algebraic Thinking</i>	OA.3
36	<i>Number and Operations in Base Ten</i>	NBT.4
37	<i>Number and Operations in Base Ten</i>	NBT.3
38	<i>Number and Operations-Fractions</i>	NF.1
39	<i>Geometry</i>	G.1
40	<i>Number and Operations-Fractions</i>	NF.5
41	<i>Operations and Algebraic Thinking</i>	OA.3
42	<i>Measurement and Data</i>	MD.3