

# 2021 MCAS Sample Student Work and Scoring Guide

## Grade 5 Mathematics

### Question 4: Constructed-Response

**Reporting Category:** Operations and Algebraic Thinking

**Standard:** [5.OA.B.3](#) - Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane.

**Item Description:** Given the rules for two patterns, determine the first several terms of each pattern and create and graph ordered pairs using corresponding terms of the two patterns.

**Calculator:** Not allowed

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### Scoring Guide

Select a score point in the table below to view the sample student response.

Score*	Description
<a href="#">4A</a>	The student response demonstrates an exemplary understanding of the Operations & Algebraic Thinking concepts involved in generating two numerical patterns using two given rules, identifying apparent relationships between corresponding terms, forming ordered pairs consisting of corresponding terms from the two patterns, and graphing the ordered pairs on a coordinate plane. The student correctly determines the first four terms of two patterns given the rules, creates ordered pairs from the corresponding terms in the patterns, and graphs the ordered pairs.
<a href="#">4B</a>	
<a href="#">3</a>	The student response demonstrates a good understanding of the Operations & Algebraic Thinking concepts involved in generating two numerical patterns using two given rules, identifying apparent relationships between corresponding terms, forming ordered pairs consisting of corresponding terms from the two patterns, and graphing the ordered pairs on a coordinate plane. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is flawed. As a result, the response merits 3 points.
<a href="#">2</a>	The student response demonstrates a fair understanding of the Operations & Algebraic Thinking concepts involved in generating two numerical patterns using two given rules, identifying apparent relationships between corresponding terms, forming ordered pairs consisting of corresponding terms from the two patterns, and graphing the ordered pairs on a coordinate plane. The mixed evidence provided by the student merits 2 points.
<a href="#">1</a>	The student response demonstrates a minimal understanding of the Operations & Algebraic Thinking concepts involved in generating two numerical patterns using two given rules, identifying apparent relationships between corresponding terms, forming ordered pairs consisting of corresponding terms from the two patterns, and graphing the ordered pairs on a coordinate plane.
<a href="#">0</a>	The student response contains insufficient evidence of an understanding of the Operations & Algebraic Thinking concepts involved in generating two numerical patterns using two given rules, identifying apparent relationships between corresponding terms, forming ordered pairs consisting of corresponding terms from the two patterns, and graphing the ordered pairs on a coordinate plane. As a result, the response does not merit any points.

\*Letters are used to distinguish between sample student responses that earned the same score (e.g., 4A and 4B).

**Score Point 4A**

**This question has four parts.**

A student created two number patterns, Pattern X and Pattern Y.

**Part A**

Pattern X starts with the number 2 and follows the rule "Add 3."

Starting with 2, write the first four numbers of Pattern X.

Enter your answer in the space provided.

2, 5, 8, 11 are the first four numbers in Pattern X.

**Part B**

Pattern Y starts with the number 13 and follows the rule "Subtract 3."

Starting with 13, write the first four numbers of Pattern Y.

Enter your answer in the space provided.

13, 10, 7, 4 are the first four numbers of Pattern Y.

**Part C**

Write four coordinate pairs in the form  $(X,Y)$  for the first four corresponding terms in Pattern X and Pattern Y.

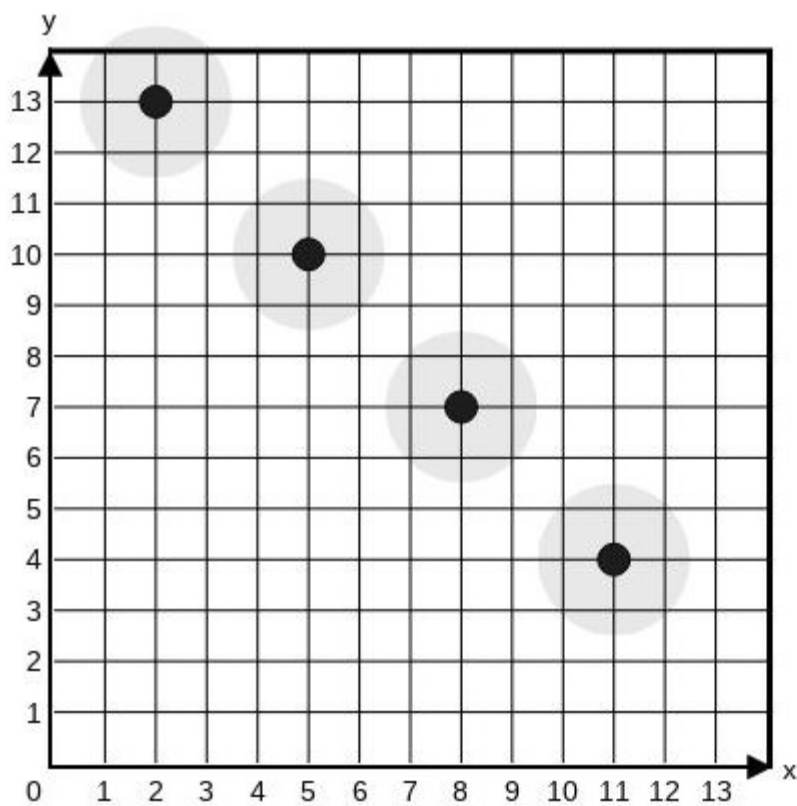
Enter your answer in the space provided.

$(2,13)$   $(5,10)$   $(8,7)$   $(11,4)$  are four corresponding terms from Pattern X and Pattern Y.

**Part D**

Plot your four coordinate pairs from Part C on this coordinate plane.

Select the places on the coordinate plane to plot the four points.



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**Score Point 4B**

**This question has four parts.**

A student created two number patterns, Pattern X and Pattern Y.

**Part A**

Pattern X starts with the number 2 and follows the rule "Add 3."

Starting with 2, write the first four numbers of Pattern X.

Enter your answer in the space provided.

2, 5, 8, 11

**Part B**

Pattern Y starts with the number 13 and follows the rule "Subtract 3."

Starting with 13, write the first four numbers of Pattern Y.

Enter your answer in the space provided.

13, 10, 7, 4

**Part C**

Write four coordinate pairs in the form  $(X,Y)$  for the first four corresponding terms in Pattern X and Pattern Y.

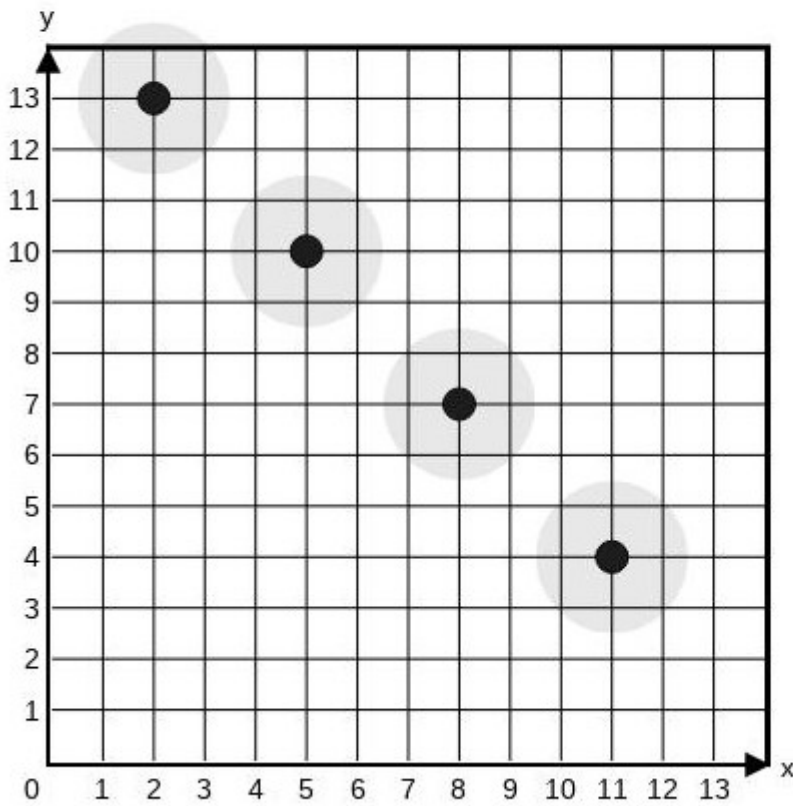
Enter your answer in the space provided.

$(2,13)$ ,  $(5,10)$ ,  $(8,7)$ , and  $(11,4)$

**Part D**

Plot your four coordinate pairs from Part C on this coordinate plane.

Select the places on the coordinate plane to plot the four points.



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**Score Point 3**

**This question has four parts.**

A student created two number patterns, Pattern X and Pattern Y.

**Part A**

Pattern X starts with the number 2 and follows the rule "Add 3."

Starting with 2, write the first four numbers of Pattern X.

Enter your answer in the space provided.

2,5,8,11

**Part B**

Pattern Y starts with the number 13 and follows the rule "Subtract 3."

Starting with 13, write the first four numbers of Pattern Y.

Enter your answer in the space provided.

13,10,7,4

**Part C**

Write four coordinate pairs in the form  $(X,Y)$  for the first four corresponding terms in Pattern X and Pattern Y.

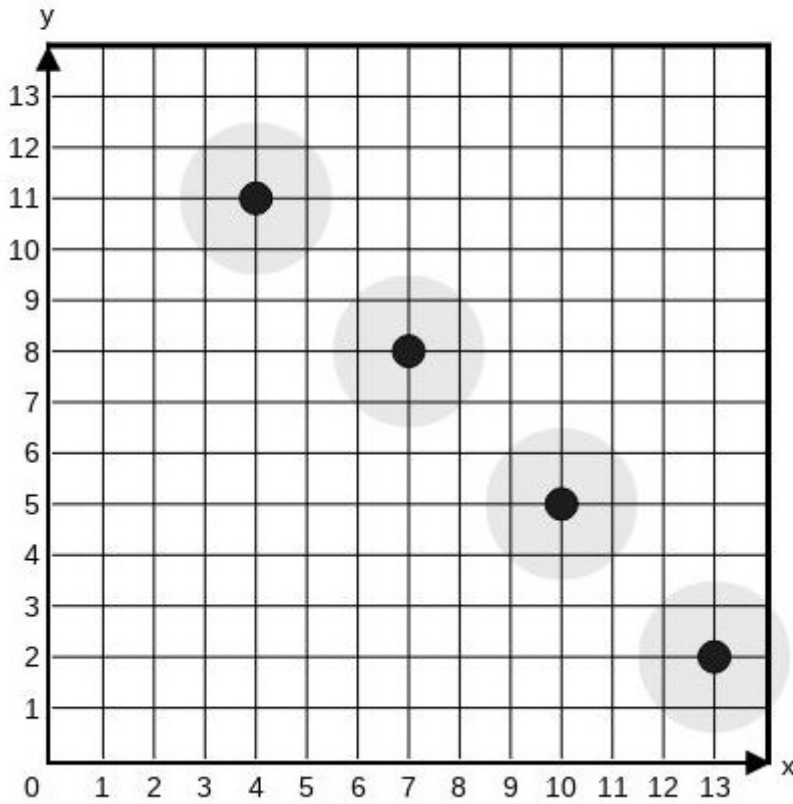
Enter your answer in the space provided.

$(2,13)$ ,  $(5,10)$ ,  $(8,7)$ ,  $(11,4)$

**Part D**

Plot your four coordinate pairs from Part C on this coordinate plane.

Select the places on the coordinate plane to plot the four points.



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**Score Point 2**

**This question has four parts.**

A student created two number patterns, Pattern X and Pattern Y.

**Part A**

Pattern X starts with the number 2 and follows the rule "Add 3."

Starting with 2, write the first four numbers of Pattern X.

Enter your answer in the space provided.

2,5,8,11

**Part B**

Pattern Y starts with the number 13 and follows the rule "Subtract 3."

Starting with 13, write the first four numbers of Pattern Y.

Enter your answer in the space provided.

13,10,7,4

**Part C**

Write four coordinate pairs in the form  $(X,Y)$  for the first four corresponding terms in Pattern X and Pattern Y.

Enter your answer in the space provided.

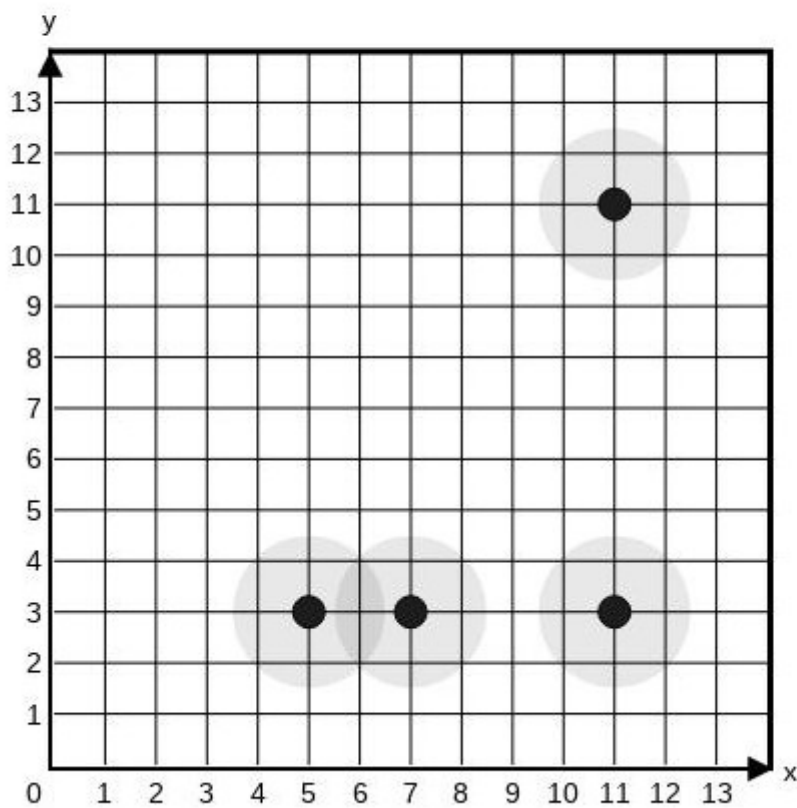
$(2,3)$ ,  $(13,3)$ ,  $(5,11)$ ,  $(7,3)$



**Part D**

Plot your four coordinate pairs from Part C on this coordinate plane.

Select the places on the coordinate plane to plot the four points.



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**Score Point 1**

**This question has four parts.**

A student created two number patterns, Pattern X and Pattern Y.

**Part A**

Pattern X starts with the number 2 and follows the rule "Add 3."

Starting with 2, write the first four numbers of Pattern X.

Enter your answer in the space provided.

2,5,8,11

**Part B**

Pattern Y starts with the number 13 and follows the rule "Subtract 3."

Starting with 13, write the first four numbers of Pattern Y.

Enter your answer in the space provided.

13,16,19,22

**Part C**

Write four coordinate pairs in the form (X,Y) for the first four corresponding terms in Pattern X and Pattern Y.

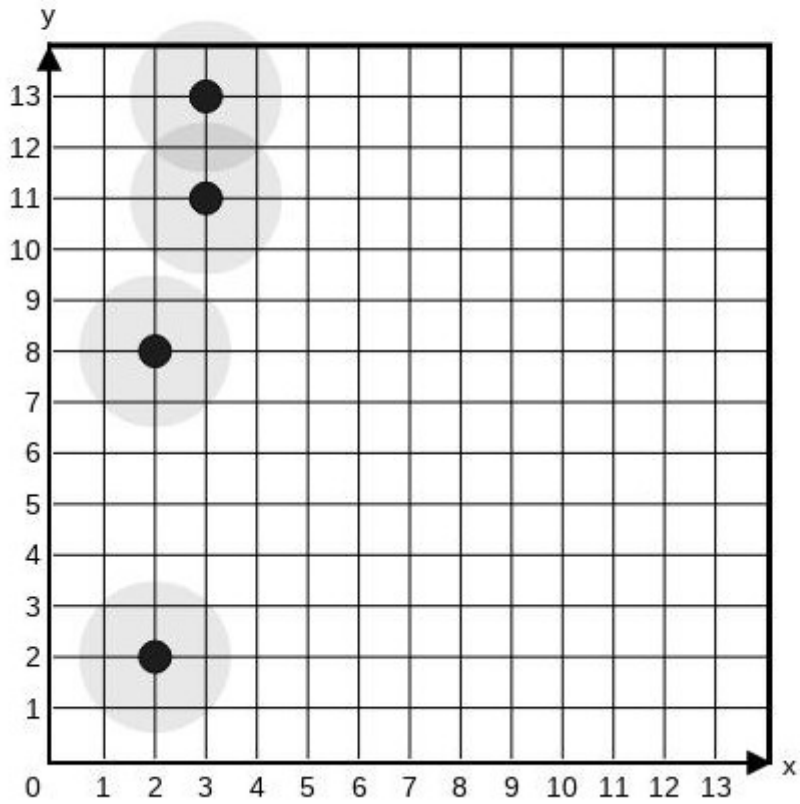
Enter your answer in the space provided.

A has 2,5,8,11 but B has 13,16,19,22 there is no same numbers in the pairs.

**Part D**

Plot your four coordinate pairs from Part C on this coordinate plane.

Select the places on the coordinate plane to plot the four points.



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**Score Point 0**

**This question has four parts.**

A student created two number patterns, Pattern X and Pattern Y.

**Part A**

Pattern X starts with the number 2 and follows the rule "Add 3."

Starting with 2, write the first four numbers of Pattern X.

Enter your answer in the space provided.

$2 + 3 = 5$  that equals 5

**Part B**

Pattern Y starts with the number 13 and follows the rule "Subtract 3."

Starting with 13, write the first four numbers of Pattern Y.

Enter your answer in the space provided.

$13 - 3 = 10$  i subtacted 13 minus 3 and i got 10

**Part C**

Write four coordinate pairs in the form  $(X,Y)$  for the first four corresponding terms in Pattern X and Pattern Y.

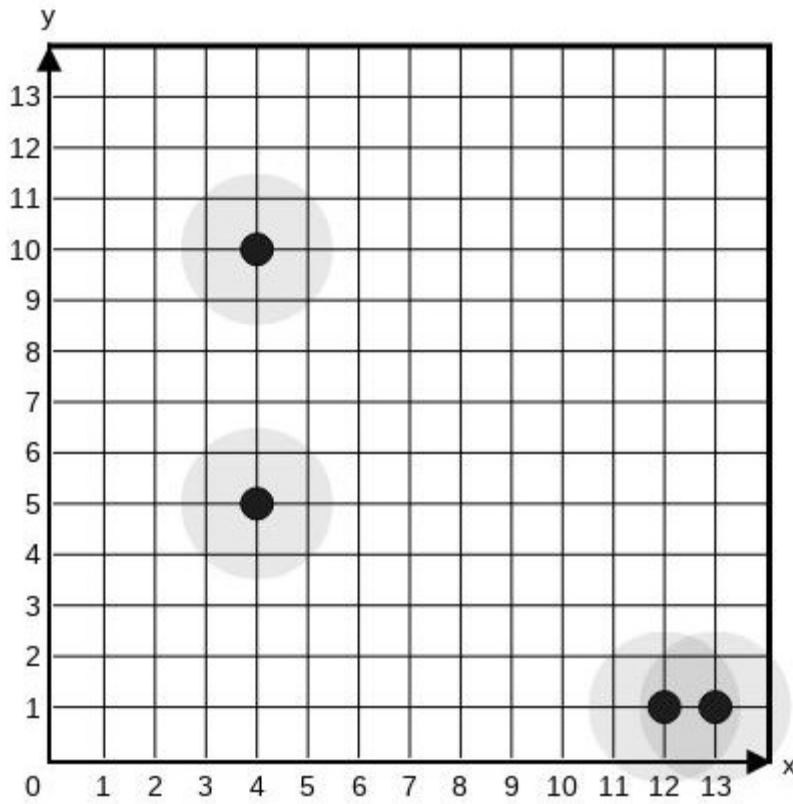
Enter your answer in the space provided.

$10 - 5 = 5$  i subtacted 10 minus 5 and i got 5

**Part D**

Plot your four coordinate pairs from Part C on this coordinate plane.

Select the places on the coordinate plane to plot the four points.



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