Content Standard	***MAFS.4.OA*** *Operations and Algebraic Thinking* ***MAFS.4.OA.3*** *Generate and analyze patterns.* **MAFS.4.OA.3.5** Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*
Assessment Limits	Whole numbers. Operations in patterns limited to addition, subtraction, multiplication, and division. Growing shape patterns.
Calculator	No
Acceptable Response Mechanisms	Equation Response Graphic Response – Drawing/Graphing, Drag and Drop Matching Item Response Multiple Choice Response Multi-Select Response Natural Language Response Table Response
Context	Allowable
Example	
Context	A pattern is shown. Intermediate initial terms (between 10 and 100). Intermediate rates of change (between 10 and 20 for addition/subtraction; between 5 and 10 for multiplication/division).
Context easier	Addition and subtraction patterns. Smaller initial terms (less than 10). Smaller rates of change.
Context more difficult	Multiplication and division patterns. Larger initial terms (greater than 100). Larger rates of change. Rules that use two operations. Shape patterns are generally more difficult than numeric patterns.

Sample Item Stem	Response Mechanism	Notes, Comments
The first number in a pattern is 5. The pattern follows the rule "Add 3." What is the next number in the pattern?	Equation Response	

<table>
<tr>
<td>The first number in a pattern is 6. The pattern follows the rule “Divide by 2, and then add 8.” Complete the table to show the next three numbers in the pattern.

<table><tr><td>Numbers in the Pattern</td></tr><tr><td>6</td></tr><tr><td></td></tr><tr><td></td></tr><tr><td></td></tr></table></td>
<td>Table Response</td>
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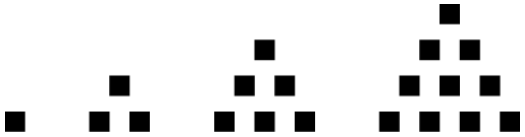
<td>A shape pattern is shown.

Describe how the number of total squares in each shape is related to the shape’s number.</td>
<td>Natural Language Response</td>
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