Content Standard	***MAFS.5.OA*** *Operations and Algebraic Thinking* ***MAFS.5.OA.2*** *Analyze patterns and relationships.* **MAFS.5.OA.2.3** 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. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so*.
Assessment Limits	Whole numbers and fractions with denominators less than 10. Quadrant I on coordinate plane. Acceptable operations: addition, subtraction, multiplication, and division. The rule should be no more complex than one finds in an application of the associative or distributive property. Examples should not contain nested grouping symbols.
Calculator	No
Acceptable Response Mechanisms	Equation Response Graphic Response – Drawing/Graphing Multiple Choice Response Multi-Select Response Natural Language Response Table Response
Context	Allowable
Example	
Context	Use two one-step patterns that use different operations. Michael uses the rule "multiply by 2." John uses the rule "add 10."
Context easier	Use two patterns which use the same operation. Michael uses the rule "multiply by 2." John uses the rule "multiply by 10."
Context more difficult	Use at least one multi-operation pattern. Michael uses the rule "multiply by 2, then add 4." John uses the rule "subtract 2, then multiply by 3."

<table>
<tr><th>Sample Item Stem</th><th>Response Mechanism</th><th>Notes, Comments</th></tr>
<tr><td>Michael and John are creating patterns. Each pattern starts at 1.

• Michael uses the rule “multiply by 2.”
• John uses the rule “multiply by 4.”

Complete the table to show the next two numbers in each pattern.

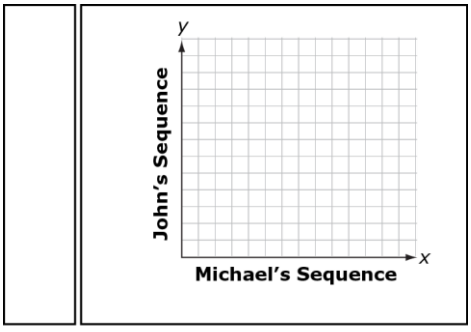
<table>
<tr><td colspan="2">Michael's Pattern</td></tr>
<tr><td>Term</td><td>Number</td></tr>
<tr><td>1</td><td></td></tr>
<tr><td>2</td><td></td></tr>
<tr><td>3</td><td></td></tr>
</table>
<table>
<tr><td colspan="2">John's Pattern</td></tr>
<tr><td>Term</td><td>Number</td></tr>
<tr><td>1</td><td></td></tr>
<tr><td>2</td><td></td></tr>
<tr><td>3</td><td></td></tr>
</table>
</td><td>Table Response</td><td></td></tr>
<tr><td>Michael and John are creating patterns.

• Michael uses the rule “multiply by 2” and starts at 5.
• John uses the rule “add 8” and starts at 16.

For which term is Michael’s number equal to John’s number?</td><td>Equation Response</td><td></td></tr>
<tr><td>Michael and John are creating patterns. Each pattern starts at 1.

• Michael uses the rule “multiply by 2, then add 3.”
• John uses the rule “multiply by 2, then add 4.”

Use the Add Point tool to plot the ordered pairs that are created from the first three terms of the sequences.

 
</td><td>Graphic Response – Drawing/Graphing</td><td></td></tr>
</table>

Michael and John each created a numeric pattern. Both patterns start with 0. The terms in Michael's pattern are always two times the same terms in John's pattern. What could be the rules for the two patterns? A. Michael: Add 2 John: Add 0 B. Michael: Add 6 John: Add 3 C. Michael: Multiply by 2 John: Multiply by 0 D. Michael: Multiply by 6 John: Multiply by 3	Multiple Choice Response	