

Pattern Rule Detectives

Check each pattern against its rule.

4.PAR.3.1 "Generate both number and shape patterns that follow a provided rule."

NAME _____

DATE _____

FOLLOWS THE RULE

A pattern matches when every term follows the stated rule.

Rule: Begin with 11, then double. 11, 22, 44, 88

DOES NOT FOLLOW THE RULE

A pattern breaks the rule when at least one term does not follow it.

Rule: Repeat oval, crescent, pentagon. oval, crescent, pentagon, oval, pentagon, crescent

1 SORT _____ 8 items

For each item, circle MATCHES or BREAKS, then choose two items and explain how the pattern does or does not follow its rule.

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| 1. Rule: Add 7. 6, 13, 20, 27 | ☐ MATCHES ☐ BREAKS |
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| 2. Rule: Repeat triangle, triangle, square. triangle, triangle, square, triangle, triangle, square | ☐ MATCHES ☐ BREAKS |
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| 3. Rule: Subtract 4. 30, 26, 23, 19 | ☐ MATCHES ☐ BREAKS |
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| 4. Rule: Repeat circle, rectangle. circle, rectangle, circle, rectangle, circle, rectangle | ☐ MATCHES ☐ BREAKS |
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| 5. Rule: Multiply by 3. 4, 12, 35, 105 | ☐ MATCHES ☐ BREAKS |
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| 6. Rule: Repeat star, hexagon, star. star, hexagon, star, hexagon, star, star | ☐ MATCHES ☐ BREAKS |
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| 7. Rule: Add 9. 1, 10, 19, 28 | ☐ MATCHES ☐ BREAKS |
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| 8. Rule: Repeat heart, diamond. heart, diamond, heart, diamond, heart, diamond | ☐ MATCHES ☐ BREAKS |

2 PROVE IT Explain your thinking

Pick two items from Part 1. For each one, tell how you knew where it belonged.

ITEM # _____ HOW I KNEW _____

ITEM # _____ HOW I KNEW _____

3 MAKE YOUR OWN One of each

Write one new MATCHES example and one new BREAKS example. Include a rule and a pattern for each one.

MATCHES _____

BREAKS _____

CHALLENGE

Make a number pattern with two alternating steps. Write both steps and the first six numbers.

PART 1 • SORT

#	ITEM	CATEGORY	WHY
1	Rule: Add 7. 6, 13, 20, 27	MATCHES	Each number is 7 more than the number before it.
2	Rule: Repeat triangle, triangle, square. triangle, triangle, square, triangle, triangle, square	MATCHES	The three-shape unit repeats correctly.
3	Rule: Subtract 4. 30, 26, 23, 19	BREAKS	After 26, the pattern subtracts 3 instead of 4.
4	Rule: Repeat circle, rectangle. circle, rectangle, circle, rectangle, circle, rectangle	MATCHES	The two-shape unit repeats correctly.
5	Rule: Multiply by 3. 4, 12, 35, 105	BREAKS	After 12, the next number should be 36, not 35.
6	Rule: Repeat star, hexagon, star. star, hexagon, star, hexagon, star, star	BREAKS	The fourth shape should be a star, not a hexagon.
7	Rule: Add 9. 1, 10, 19, 28	MATCHES	Each number is 9 more than the number before it.
8	Rule: Repeat heart, diamond. heart, diamond, heart, diamond, heart, diamond	MATCHES	The two-shape unit repeats correctly.

PART 2 • PROVE IT

Accept any explanation that names the deciding feature from the rule box for the chosen item.

PART 3 • MAKE YOUR OWN (SAMPLE ANSWERS)

- **MATCHES:** Rule: Repeat trapezoid, arrow. trapezoid, arrow, trapezoid, arrow
- **BREAKS:** Rule: Add 8. 9, 17, 25, 34

Challenge: Rule: Start at 3. Add 4, then add 1, and repeat. 3, 7, 8, 12, 13, 17

For Part 2, students may choose any two items. Check that each explanation names a correct step in the pattern and compares it to the stated rule.