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PATTERNS AND RULES

Station Number Three

A pattern can be found in a list of numbers or shapes that follow a rule to determine their order. There are different kinds of patterns.

Growing Pattern: 3, 5, 7, 9, 11, …

To find the rule, compare each pair of numbers in the list.

Notice: 3 + **2** = 5
5 + **2** = 7
7 + **2** = 9
9 + **2** = 11

To find the next number in the pattern, the rule is to add 2 to the last term.

Repeating Pattern: 1, 2, 2, 1, 2, 2, …

To find the rule, look for a pattern in the way the numbers are repeated.

The rule is to repeat 1, 2, 2.

Tell if each pattern is a growing pattern or a repeating pattern. Find the rule for the pattern.

1. 1, 4, 7, 10, 13, … _____

2. 5, 9, 13, 17, 21, … _____

3. 7, 4, 7, 4, 7, 4, … _____

4. 5, 15, 25, 35, 45, … _____

5. 3, 5, 1, 3, 5, 1, 3, 5, … _____

6. 8, 13, 18, 23, 28, … _____

7. 6, 16, 6, 16, 6, … _____

8. 30, 300, 30, 300, 30, … _____

CHALLENGE

Find the next number in each pattern in Exercises 1–5.

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PATTERNS AND RULES

A pattern can be found in a list of numbers or shapes that follow a rule to determine their order. Use the rule to find the next number in the pattern.

Increasing Pattern:
2, 12, 22, 32, 42, …

Notice: 2 + **10** = 12
12 + **10** = 22 and so on.

The rule is to add 10.
The next number in the pattern is
42 + 10, or 52.

Decreasing Pattern:
39, 36, 33, 30, 27, …

Notice: 39 – **3** = 36
36 – **3** = 33 and so on.

The rule is to subtract 3.
The next number in the pattern is
27 – 3, or 24.

Repeating Pattern:
2, 3, 3, 2, 3, 3, …

To find the rule, look for a pattern in the way the numbers are repeated.

The rule is to repeat 2, 3, 3.
The next number in the pattern is 2.

Write the rule for each pattern. Then find the next number in the pattern.

1. 8, 12, 8, 12, 8, … _____

2. 4, 9, 14, 19, 24, … _____

3. 50, 48, 46, 44, 42, … _____

4. 100, 90, 80, 70, 60, … _____

5. 21, 41, 61, 81, … _____

CHALLENGE

Explain how to find the next two numbers in the following pattern:
2, 3, 4, 3, 6, 3, 8, 3, …
What are the next two numbers in the pattern?

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PATTERNS AND RULES

A pattern can be found in a list of numbers or shapes that follow a rule to determine their order. Use the rule to find the next number in the pattern.

Growing Pattern:
1.2, 2.4, 4.8, 9.6, …

Notice: $1.2 \times \mathbf{2} = 2.4$
$2.4 \times \mathbf{2} = 4.8$ and so on.

The rule is to multiply by 2.
The next number in the pattern is 9.6×2, or 19.2.

Decreasing Pattern:
95, 87, 79, 71, …

Notice: $95 - \mathbf{8} = 87$
$87 - \mathbf{8} = 79$ and so on.

The rule is to subtract 8.
The next number in the pattern is $71 - 8$, or 63.

Combined Pattern:
3, 2, 5, 2, 7, 2, …

The number 2 is repeated. The other numbers increase by 2.

A rule for the pattern is to add 2 to the numbers in the odd places in the pattern. Repeat the number 2 in the even places. The next number in the pattern is 9.

Write a rule for each pattern. Then find the next three numbers in the pattern.

1. 10.1, 9.6, 9.1, 8.6, … _____

2. 1, 3, 9, 27, … _____

3. 3, 6, 12, 24, … _____

4. 200, 5, 180, 5, 160, 5, … _____

_____

5. 2.5, 3.6, 4.7, 5.8, … _____

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CHALLENGE

Write a rule for the following pattern. Then find the next two numbers in the pattern.
8, 15, 12, 19, 16, 23, … _____

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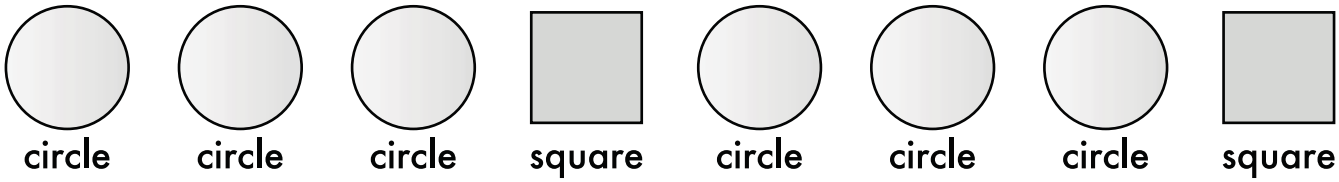
REPRESENTING PATTERNS

You can continue a pattern to find what comes next.

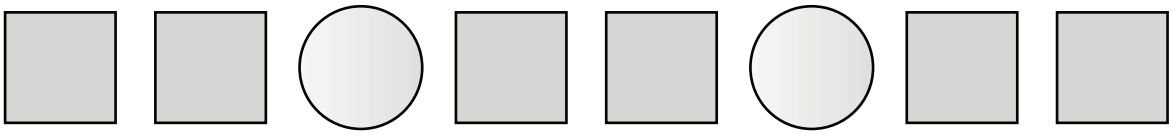


The pattern is a repeating pattern of shapes: circle, circle, circle, square.
You can also use numbers to describe the pattern: 1, 1, 1, 2, 1, 1, 1, 2.

Continue the pattern to find the next shape in the pattern.
Since a circle follows the square, the next shape is a circle.

Draw the next shape in each pattern.
Then use numbers to describe the pattern.

1.



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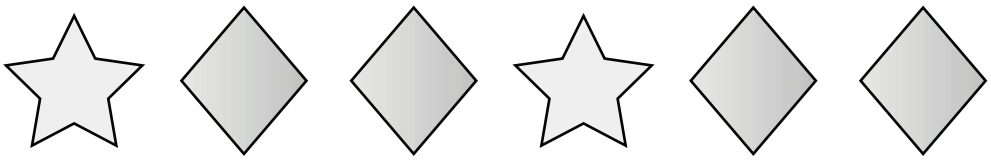

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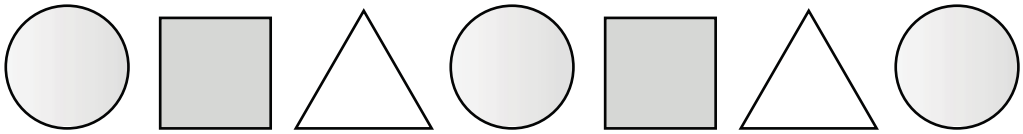

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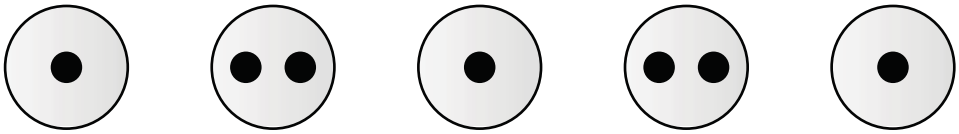

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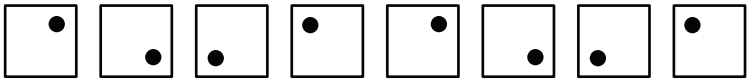
REPRESENTING PATTERNS

You can continue a pattern to find what comes next.

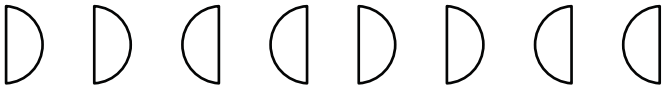


The pattern is a repeating pattern of squares.
The dot rotates $\frac{1}{4}$ turn clockwise each time.

You can also use numbers to describe the pattern: 1, 2, 3, 4, 1, 2, 3, 4.

Continue the pattern to find the next shape in the pattern.
The next number in the number pattern is 1.
The next shape in the shape pattern is the first figure.

Draw the next shape in each pattern.
Then use numbers to describe the pattern through two cycles.

1. 

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2.

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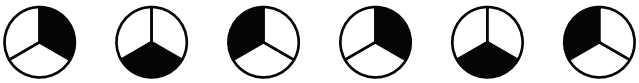
3. 

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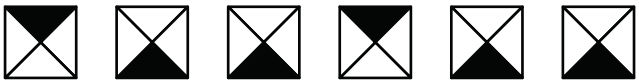
4. 

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5.

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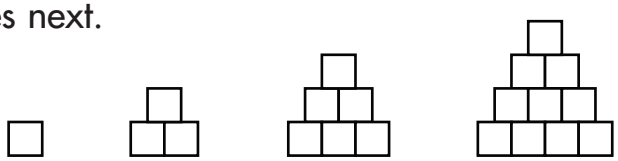
REPRESENTING PATTERNS

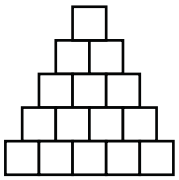
You can continue a pattern to find what comes next.

The pattern is a growing shape pattern.
Each time a row is added at the bottom
with 1 more square than in the previous shape.

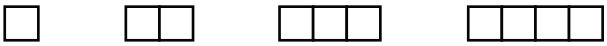


You can also use numbers to describe the pattern: 1, 3, 6, 10, …

To draw the next shape in the pattern,
add on a row with 5 squares at the bottom.
To continue the number pattern,
add 5 to the last number: 10 + 5 = 15.



Draw the next shape in each pattern.
Then use numbers to describe the pattern through four elements.

1. 

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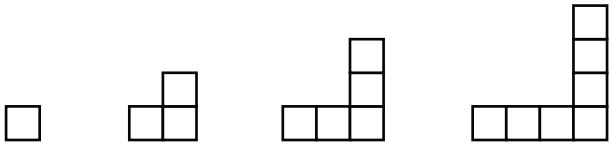
2. 

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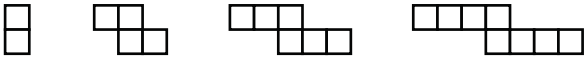
3. 

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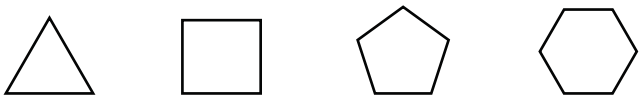
4. 

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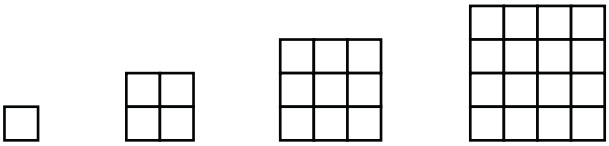
5. 

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