

1-2

NAME _____ DATE _____

Patterns and Sequences (Pages 12–18)

A visual pattern is usually a repeating series of shapes or colors. For example, in the pattern ♠ ♣ ♥ ♦ ♠ ♣ ♥ ♦, the shapes repeat after the fourth shape. Once you understand how the pattern repeats, you can predict which shape would appear in the 9th position, or any other position in the pattern. Number patterns are called sequences. A **sequence** is a set of numbers in a specific order. For example, the numbers 3, 6, 9, 12, and 15 form a sequence. The individual numbers in the sequence are called **terms**. Sometimes a pattern or sequence can lead to a general rule that can be written as an algebraic expression.

EXAMPLES

- A** What are the next three figures in the pattern ▲►▼◄▲?

The pattern consists of a triangle that rotates clockwise starting with the ▲ position. The next three figures in the pattern would be ►▼◄.

- B** Find the next three terms in the sequence 5, 12, 19, 26, 33, ...

Study the pattern in the sequence. Notice that each term is 7 more than the terms before it. To find the next three terms, start by adding 7 to 33.

$$33 + 7 = 40$$

$$40 + 7 = 47$$

$$47 + 7 = 54 \quad \text{The next three terms are 40, 47, 54.}$$

Try These Together

Give the next three items for each pattern.

1. ◄◄◄ ◄◄◄ ◄◄◄ ◄◄◄ ◄◄◄

2. $c + 1, c - 1, c + 2, c - 2, \dots$

PRACTICE

Give the next two items for each pattern.



5. 2, 5, 8, 11, ...

6. 3, 5.5, 8, 10.5, ...

7. 10, 8, 6, 4, ...

8. $x - 1, x - 3, x - 5, \dots$

9. x^3, x^6, x^9, \dots

10. $a - 1b, a - 2b, a - 3b, \dots$

11. $2x, 4x, 8x, \dots$

12. -1, 1, -1, 1, ...

13. $3x, 9x, 27x, \dots$

14. **Finding Patterns** Fill in the table at the right. What would be the next number in the pattern?

4^1	4^2	4^3	4^4	4^5	4^6
2	16	64			



15. **Standardized Test Practice** Give the next item for the pattern $a + a, a + ab, a + abc, \dots$

A $a + abcd$

B $a + abbc$

C $a + abca$

D $a + abca$

Answers: 1. $\uparrow\uparrow\uparrow\uparrow\Rightarrow$ 2. $c + 3, c - 3, c + 4$ 3-4. See Answer Key. 5. 14, 17 6. 13, 15.5 7. 2, 0 8. $x - 7, x - 9$ 9. x^{12}, x^{15} 10. $a - 4b, a - 5b$ 11. 16x, 32x 12. -1, 1 13. $81x, 243x$ 14. 256; 1024; 4096; 16,384 15. A