LESSON
21 Rules for Patterns

Review It! When you work with rules for patterns, remember these words:

sequence a list of numbers

number pattern a sequence of numbers that follows a rule

What is a rule for getting from one number to the next in this sequence?
2, 6, 10, 14, 18, 22, . . .

Step 1 Find the pattern.

Each number is greater than the number before it.

The terms increase, so the pattern uses addition or multiplication.

Try an addition pattern by finding the differences between terms.

second term − first term = 6 − 2 = _____
third term − second term = 10 − 6 = _____
fourth term − third term = 14 − 10 = _____
fifth term − fourth term = 18 − 14 = _____
sixth term − fifth term = 22 − 18 = _____

The difference is always _____.

THINK The difference is always the same.

Step 2 Write a rule for the pattern.

In words, the rule is add _____.

You can write the rule as $y = x + 4$.

So, the rule for the pattern is "add _____."

Try It! Find the first five terms of a sequence using the given rule.

Ask Yourself

1. Start with 4. Add 7. _____

2. Start with −6. Subtract 5. _____

1. What is the second term? 4, or 11?

Find a rule for getting from one number to the next.

3. 11, 9, 7, 5, 3, . . . _____

4. 3, 8, 13, 18, 23, . . . _____

3. What is 9 − 11? 2, or −2?

5. −10, −2, 6, 14, 22, . . . _____

6. 25, 22, 19, 16, 13, . . . _____

Find a rule for getting from one number to the next.

7.

x	1	2	3	4	5
y	7	16	25	34	43

_____

8.

x	1	2	3	4	5
y	−4	3	10	17	24

_____

7. What is the rule? add 6, or add 9?

Solve.

9. Mario made a table that compares the numbers in a sequence with their positions. What is a rule for getting from one number to the next in the pattern?

x	1	2	3	4	5
y	−5	−3	−1	1	3

_____

9. What are the numbers in the sequence? 1, 2, 3, 4, 5; or −5, −3, −1, 1, 3?

On Your Own!

Circle the best answer for each question.

1. In each table, the x-values are the positions of terms in a sequence, and the y-values are the terms. Which table shows the pattern whose rule for getting from one term to the next is *add 3*?

A.

x	1	2	3	4	5
y	7	10	12	15	17

B.

x	1	2	3	4	5
y	4	7	10	13	16

C.

x	1	2	3	4	5
y	3	6	12	24	48

D.

x	1	2	3	4	5
y	5	10	15	20	25

2. What is a rule for getting from one number to the next in this sequence?

$-16, -15, -14, -13, -12, -11, \ldots$

A. add -1
B. add 2
C. subtract 1
D. add 1

3. In each table, the x-values are the positions of terms in a sequence, and the y-values are the terms. Which table shows the pattern whose rule for getting from one term to the next is *subtract 6*?

A.

x	1	2	3	4	5
y	6	11	16	21	26

B.

x	1	2	3	4	5
y	4	10	16	22	28

C.

x	1	2	3	4	5
y	32	26	20	14	8

D.

x	1	2	3	4	5
y	19	13	8	4	1

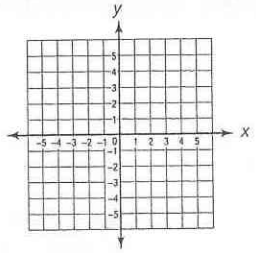
4. What is a rule for getting from one term to the next in this sequence?

5, 13, 21, 29, 37, 45, ...

A. add 8
B. add 7
C. multiply by 2
D. subtract 8

5. In the table, the x-values are the positions of terms in a sequence, and the y-values are the terms.

x	1	2	3	4
y	-5	-2	1	4



Part A What is a rule for getting from one term to the next?

Part B Graph points on the grid above for the ordered pairs. Draw a line through the points.

Part C Find the slope of the line.

Math Words

Fill in the blanks.

6. You can use addition or multiplication to find a rule if a pattern is _____.

7. You can use subtraction or division to find a rule if a pattern is _____.