



Name _____ Date _____

Sequences (Pages 296–299)

A **sequence** is a list of numbers in a certain order. Each number is called a **term** of the sequence. In an **arithmetic** sequence, the difference between any two consecutive terms is the same. This difference is called the **common difference**. In a **geometric sequence**, the consecutive terms of a sequence are formed by multiplying by a constant factor called the **common ratio**.

EXAMPLES

- A** Identify the pattern in 22, 19, 16, 13, 10, ... and write the next five terms.
Try $19 - 22 = -3$. If you add -3 to 19, do you get the next term, 16? Yes, and this pattern continues, so this is an arithmetic sequence with a common difference of -3 . The next five terms are 7, 4, 1, -2 , and -5 .

- B** Identify the pattern in 20, 10, 5, 2.5, 1.25, ... and write the next three terms.
There is no common difference. What can you multiply 20 by to get 10? 0.5. Does this common ratio continue? Yes, so this geometric sequence has a common ratio of 0.5. The next three terms are 0.625, 0.3125, and 0.15625.

Try These Together

1. Identify 0, 3, 6, 9, ... as *arithmetic*, *geometric*, or *neither*. Then find the next three terms.
HINT: What can you add to each term to give you the next term?

2. Identify $-7, -6\frac{1}{2}, -6, -5\frac{1}{2}, \dots$ as *arithmetic*, *geometric*, or *neither*. Then find the next three terms.
HINT: What can you add to each term to give you the next term?

PRACTICE

Identify each sequence as arithmetic, geometric, or neither. Then find the next three terms.

3. $-3, -1, -\frac{1}{3}, -\frac{1}{9}, \dots$ 4. $-3, -2, 0, 3, \dots$ 5. 88, 93, 99, 106, ...
 6. 80, $-40, 20, -10, \dots$ 7. $4, -3, -10, -17, \dots$ 8. $8, 8\frac{2}{3}, 9\frac{1}{3}, 10, \dots$

9. **Fitness** Hank wants to increase the number of push-ups he does each day by 3. If on the first day he does 2, how many will he try to do on the 10th day?



10. **Standardized Test Practice** What is the next term in the sequence 1.3, 1.7, 2.1, 2.5, ...?

A 3.3

B 3.1

C 2.9

D 2.7

Answers: 1. arithmetic; 12, 15, 18 2. arithmetic; $-5, -4\frac{1}{2}, -4$ 3. geometric; $-\frac{1}{27}, -\frac{1}{81}, -\frac{1}{243}$ 4. neither; 7, 12, 18
 5. neither; 114, 123, 133 6. geometric; $5, -2\frac{1}{2}, 1\frac{1}{4}$ 7. arithmetic; $-24, -31, -38$ 8. arithmetic; $10\frac{2}{3}, 11\frac{1}{3}, 12$ 9. 29 10. C