

Lesson 5-10

Example 1 Identify an Arithmetic Sequence

State whether the sequence 5, 11, 17, 23, 29, ... is arithmetic. If it is, state the common difference and write the next three terms.

5, 11, 17, 23, 29

Notice that $11 - 5 = 6$, $17 - 11 = 6$, and so on.

+ 6 + 6 + 6 + 6

The terms have a common difference of +6, so the sequence is arithmetic. Continue the pattern to find the next three terms.

29, 35, 41, 47

+ 6 + 6 + 6

The next three terms of the sequence are 35, 41, and 47.

Example 2 Identify an Arithmetic Sequence

State whether the sequence 30, 28, 24, 18, 10, ... is arithmetic. If it is, write the next three terms of the sequence.

30, 28, 24, 18, 10

- 2 - 4 - 6 - 8

The terms do not have a common difference.

The sequence is not arithmetic. However, if the pattern continues, the next three differences will be -10, -12, and -14.

10, 0, -12, -26

- 10 - 12 - 14

The next three terms are 0, -12, and -26.

Example 3 Identify Geometric Sequences

a. State whether the sequence 2, 6, 18, 54, 162, ... is geometric. If it is, state the common ratio and write the next three terms.

2, 6, 18, 54, 162

$\times 3 \quad \times 3 \quad \times 3 \quad \times 3$

Notice that $6 \div 3 = 3$, $18 \div 6 = 3$, and $54 \div 18 = 3$.

The common ratio is 3, so the sequence is geometric. Continue the pattern to find the next three terms.

162, 486, 1458, 4374

$\times 3 \quad \times 3 \quad \times 3$

The next three terms in the sequence are 486, 1458, and 4374.

b. State whether the sequence $\frac{1}{2}, -\frac{1}{4}, \frac{1}{8}, -\frac{1}{16}, \dots$ is geometric. If it is, state the common ratio and write the next three terms.

$\frac{1}{2}, -\frac{1}{4}, \frac{1}{8}, -\frac{1}{16}$

$\times -\frac{1}{2} \quad \times -\frac{1}{2} \quad \times -\frac{1}{2}$

The common ratio is $-\frac{1}{2}$ or -0.5, so the sequence is geometric. Continue the pattern to find the next three terms.

$-\frac{1}{16}, \frac{1}{32}, -\frac{1}{64}, \frac{1}{128}$

$\times \left(-\frac{1}{2}\right) \quad \times \left(-\frac{1}{2}\right) \quad \times \left(-\frac{1}{2}\right)$

The next three terms are $\frac{1}{32}, -\frac{1}{64},$ and $\frac{1}{128}$.