Geometric Series

Identify the common ratio r:

1. $1, 2, 4, 8, 16, 32, \ldots$
2. $27, 18, 12, 8, \ldots$
3. $10, 5, 2.5, 1.25, \ldots$
4. $5, -5, 5, -5, 5, -5, \ldots$
5. $x, -2x^2, 4x^3$
6. $1, p, p^2, p^3, \ldots$
7. $4, -1, 0.25, -0.0625, \ldots$

Examples

1. Determine the 10^{th} and n^{th} terms of the following:

a) 3, 6, 12, 24, …

b) 40, -20, 10, -5, …

2. The second term of a geometric sequence is 4 and the 4^{th} term is 8. The common ratio is positive. Find the exact values of:

a) The common ratio.

b) The first term.

c) The 10^{th} term.

3. The numbers $3,\ x$ and $x + 6$ form the first three terms of a positive geometric sequence. Find:

a) The value of x.

b) The 10^{th} term in the sequence.

Inequalities Example

What is the first term in the geometric progression $3,\ 6,\ 12,\ 24,$ … to exceed 1 million?

Test Your Understanding

1. All the terms in a geometric sequence are positive.

The third term of the sequence is 20 and the fifth term 80. What is the 20^{th} term?

2. The second, third and fourth term of a geometric sequence are the following:

$$x, \quad x+6, \quad 5x-6$$

a) Determine the possible values of x.

b) Given the common ratio is positive, find the common ratio.

c) Hence determine the possible values for the first term of the sequence.