

Sequences – Series – Patterns

chapter

4

Section 4.4 Geometric sequences

examples

$$\left\{ \begin{array}{l} T_1 \quad T_2 \quad T_3 \\ 3, 9, 27, 81, \dots \dots \quad (R = \times 3) \\ 4, -4, 4, -4, \dots \quad (R = \times -1) \\ \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32}, \dots \quad (R = \times \frac{1}{2}) \end{array} \right.$$

$$\frac{T_2}{T_1} = \frac{T_3}{T_2} = R$$

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Example 1

Find T_n and T_{10} of the geometric sequence $1, \frac{1}{4}, \frac{1}{16}, \frac{1}{64}, \dots$

In every geometric sequence:

$$T_1 = a$$

$$\frac{T_2}{T_1} = r$$

$$T_n = ar^{n-1}$$

$$\frac{T_{n+1}}{T_n} = r$$

$$T_n = ar^{n-1}$$

$$a = 1$$

$$r = \frac{1}{4}$$

$$n = 10$$

$$T_n = 1\left(\frac{1}{4}\right)^{n-1}$$

$$= \left(\frac{1}{4}\right)^{n-1}$$

$$T_{10} = \left(\frac{1}{4}\right)^{10-1}$$

$$= \left(\frac{1}{4}\right)^9$$

$$= \frac{1}{262144}$$