Answer on Question #42501, Math, Calculus

Problem.
Find the sum of the geometric sequence.

1, one divided by two, one divided by four, one divided by eight, one divided by sixteen

Solution.
The scale factor of the progression equals $a = 1$ and the common ratio equals $r = \frac{1}{2}$.
If the progression is finite, it equals

$$S = \frac{a(r^5 - 1)}{r - 1} = \frac{\frac{1}{32} - 1}{\frac{1}{2} - 1} = \frac{31}{16}.$$

If the progression is infinite, it equals

$$S = \frac{a}{1 - r} = 2$$

Answer: The sum for finite progression equals $\frac{31}{16}$ and the sum for infinite progression equals 2.