

Answer on Question #77600 – Math – Algebra

Question

1. The geometric series has a first term of 8 and the limiting sum of 12, find the common ratio.
2. If the limiting sum of a geometric series, $\frac{3}{4}$ is 16 find the first term.
3. If $1 + x + x^2 + \dots$ has a limiting sum of 5, find x .

Solution

$$1. S = a_1 \frac{1}{1-r} \rightarrow 12 = 8 \frac{1}{1-r} \rightarrow 1 - r = \frac{8}{12} \rightarrow r = 1 - \frac{2}{3} = \frac{1}{3}.$$

$$2. S = a_1 \frac{1}{1-r} \rightarrow 16 = a_1 \frac{1}{1-\frac{3}{4}} \rightarrow a_1 = 16 \left(1 - \frac{3}{4}\right) = 4.$$

$$3. S = a_1 \frac{1}{1-r} \rightarrow 5 = 1 * \frac{1}{1-x} \rightarrow 1 - x = \frac{1}{5} \rightarrow x = 1 - \frac{1}{5} = \frac{4}{5}.$$