

More Practice - Sequences and Series SS8: Geometric Series

KEY

Find the value of the sum:

$$1. \overset{\times 3}{2 + 6 + 18 + 54 + 162 + 486 + 1458} = \frac{2 - 1458 \cdot 3}{1 - 3} = \frac{2 - 4374}{-2} = \frac{-4372}{-2} = 2186$$

$$2. \overset{\times 4}{3 + 12 + 48 + \dots + 201326592} = \frac{3 - 201326592 \cdot 4}{1 - 4} = \frac{3 - 805306368}{-3} = 268435455$$

$$3. \overset{\times .25}{1 + .25 + .0625 + \dots} = \frac{1}{1 - .25} = \frac{1}{.75} = \frac{1}{3}$$

$$4. \overset{\times 1.5}{4 + 6 + 9 + 13.5 + 20.25 + \dots} \quad \text{NO SUM}$$

$6 \div 4 = 1.5 \quad 1.5 > 1$

$$5. \overset{\times .5}{2 + 1 + 0.5 + 0.25 + \dots + 0.015625} = \frac{2 - 0.015625}{1 - .5} = \frac{1.984375}{.5} = 3.96875$$

$$6. \overset{\times .75}{\frac{3}{2} + \frac{9}{8} + \frac{27}{32} + \dots} = \frac{3/2}{1 - .75} = \frac{1.5}{.25} = 6$$

$9/8 \div 3/2 = .75 < 1$

$$7. \sum_{n=1}^{\infty} 4 \cdot \left(\frac{3}{5}\right)^{n-1} = \frac{4}{1 - 3/5} = 4 / 2/5 = 4 \cdot \frac{5}{2} = 10$$

$3/5 < 1$

$$8. \sum_{n=1}^{17} 6 \cdot 1.25^{n-1} = \frac{6(1 - 1.25^{17})}{1 - 1.25} = \frac{6(1 - 44.408920985)}{-.25} = 1041.8141036402$$

$$9. \sum_{n=1}^{24} 7 \cdot 2^{n-1} = \frac{7(1 - 2^{24})}{1 - 2} = \frac{7(1 - 16777216)}{-1} = \frac{7(-16777215)}{-1} = 117440505$$

$$10. \sum_{n=1}^{\infty} \frac{1}{5} \cdot (3)^{n-1} \quad \text{NO SUM}$$

$3 > 1$