

Summation Notation WKST

I. Find the sum of the infinite geometric series or explain why no sum exists.

1. $\frac{2}{3} - \frac{2}{9} + \frac{2}{27} - \frac{2}{81} + \dots$	2. $\frac{4}{15} + \frac{4}{9} + \frac{20}{27} + \frac{100}{81} + \dots$
3. $\sum_{n=1}^{\infty} \frac{2}{5} \left(-\frac{5}{4}\right)^{n-1}$	4. $\sum_{n=3}^{\infty} 5 \left(\frac{1}{3}\right)^n$

II. Express the series using summation notation. Then find the sum or explain why there is no sum.

5. $4 - 2 + 1 - \frac{1}{2} + \dots$	6. $2 - 3 - 8 - 13 \dots$
7. $4 + 6 + 9 + \frac{27}{2} + \frac{81}{4}$	8. $10 + 7 + 4 + 1 - 2 - 5 - 8 - 11 - 14 - 17$
9. $9 + 6 + 4 + \frac{8}{3} + \dots$	10. $5 + 10 + 15 + \dots + 90$
11. $1 - \frac{1}{3} + \frac{1}{9} - \frac{1}{27} + \dots + \frac{1}{6561}$	12. $5 + 11 + 17 + 23 + 29 + \dots$

III. Express the series using summation notation. Then find an interval in which a sum exists.

13. $1 + 4x + 16x^2 + 64x^3 + \dots$

IV. Find the value of x .

14. $\sum_{i=1}^x (10 - 3i) = -28$	15. $\sum_{i=0}^x 3(2)^i = 3069$	16. $\sum_{i=1}^{\infty} \left(\frac{x}{4}\right)^i = -\frac{3}{7}$
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ANSWERS

1. $\frac{1}{2}$

2. No sum exists because $|r| = \left|\frac{5}{3}\right| > 1$ and the series diverges.

3. No sum exists because $|r| = \left|-\frac{5}{4}\right| > 1$ and the series diverges.

4. $\frac{5}{18}$

5. $\sum_{n=1}^{\infty} 4\left(-\frac{1}{2}\right)^{n-1} = \frac{8}{3}$

6. $\sum_{n=1}^{\infty} 7 - 5n$, No sum exists because the series diverges.

7. $\sum_{n=1}^{\infty} 4\left(\frac{3}{2}\right)^{n-1} = \frac{211}{4}$

8. $\sum_{n=1}^{10} 13 - 3n = -35$

9. $\sum_{n=1}^{\infty} 9\left(\frac{2}{3}\right)^{n-1} = 27$

10. $\sum_{n=1}^{18} 5n = 855$

11. $\sum_{n=1}^9 \left(-\frac{1}{3}\right)^{n-1} = \frac{3}{4}$

12. $\sum_{n=1}^{\infty} 6n - 1$, No sum exists because the series diverges.

13. $\sum_{n=1}^{\infty} (4x)^{n-1} = \frac{1}{1-4x}$, $-\frac{1}{4} < x < \frac{1}{4}$

14. $x = 8$

15. $x = 9$

16. $x = -3$