

MathQuest: Series

Geometric Series

1. What will we get if we add up the infinite series of numbers: $16 + 8 + 4 + 2 + 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$?
 - (a) This infinite sum will reach a number less than 32.
 - (b) This infinite sum is equal to 32.
 - (c) This infinite sum will reach a number greater than 32.
 - (d) Because we're adding up an infinite number of numbers which are all greater than zero, the sum diverges to infinity.
2. What will we get if we add up the infinite series of numbers: $12 + 4 + \frac{4}{3} + \frac{4}{9} + \frac{4}{27} + \dots$?
 - (a) This infinite sum will converge to a number less than 18.
 - (b) This infinite sum is equal to 18.
 - (c) This infinite sum will converge a number between 18 and 19.
 - (d) This infinite sum will converge a number greater than 19.
 - (e) This infinite sum diverges to infinity.
3. What will we get if we add up the infinite series of numbers: $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} + \dots$?
 - (a) This infinite sum will converge to $1/2$.
 - (b) This infinite sum will converge to $2/3$.
 - (c) This infinite sum will converge to 2.
 - (d) This is not a geometric series.
4. What will we get if we add up the first 10 terms in the series: $1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} + \dots$?
 - (a) 0.663
 - (b) 0.664
 - (c) 0.666
 - (d) 0.667
 - (e) 0.668

5. What is $\sum_{j=1}^5 4j$?
- (a) 15
 - (b) 20
 - (c) 40
 - (d) 60
6. What will we get if we add up the infinite series: $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} \dots$?
- (a) 2
 - (b) A number between 2 and 3.
 - (c) A number between 3 and 4.
 - (d) A number between 4 and 5.
 - (e) A number between 5 and 10.
 - (f) This infinite series diverges to infinity.
7. Which of the following series is not geometric?
- (a) $\sum_{n=0}^{\infty} \frac{15}{3^n}$
 - (b) $\sum_{n=5}^{\infty} 12^{2n+4}$
 - (c) $\sum_{n=1}^{\infty} 9^{-n}$
 - (d) $\sum_{n=1}^{\infty} 4^{1/n}$
 - (e) $\sum_{n=0}^{\infty} \frac{5 \cdot 3^n}{7^{3n}}$
 - (f) More than one of these is not geometric.
8. Which of the following geometric series converge?
- (a) $\sum_{n=0}^{\infty} \frac{8}{(-2)^n}$
 - (b) $\sum_{n=5}^{\infty} 6^{3n+2}$
 - (c) $\sum_{n=1}^{\infty} (-4)^{-n}$
 - (d) $\sum_{n=0}^{\infty} \frac{6 \cdot 2^n}{6^{3n}}$
 - (e) Exactly two of these converge.
 - (f) Exactly three of these converge.
9. Which of the following is/are geometric series?

- (a) $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$
- (b) $2 - \frac{4}{3} + \frac{8}{9} - \frac{16}{27} + \dots$
- (c) $3 + 6 + 12 + 24 + \dots$
- (d) $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \dots$
- (e) (a) and (b) only
- (f) (a),(b), and (c) only
- (g) All of the above

10. $-6 + 4 - \frac{8}{3} + \frac{16}{9} - \frac{32}{27} =$

- (a) $-\frac{266}{81}$
- (b) $-\frac{422}{27}$
- (c) $-\frac{110}{27}$
- (d) $\frac{110}{27}$

11. $-6 + 4 - \frac{8}{3} + \frac{16}{9} - \frac{32}{27} + \dots$

- (a) The sum exists and equals -18
- (b) The sum exists and equals $-18/5$
- (c) The sum exists and equals $18/5$
- (d) The sum exists and equals 18
- (e) The sum does not exist

12. What happens in an infinite geometric series if the common ratio equals 1?

- (a) The series has a sum, and it's equal to 1
- (b) The series has a sum, but the sum depends on the first term
- (c) The series does not have a sum because the partial sums don't have a limit