Problems for Gateway #1: Distinguishing Geometric and Non-Geometric Series

1. Which of the following is **NOT** a geometric series?

    (a) $1 + 0.1 + 0.001 + 0.0001 + \ldots$

    (b) $1 + 0.2 + 0.03 + 0.004 + \ldots$

    (c) $1 + 0.01 + 0.0001 + 0.000001 + \ldots$

    (d) $0.2 + 0.02 + 0.002 + \ldots$

2. Which of the following is **NOT** a geometric series?

    (a) $1 + \dfrac{1}{2} + \left(\dfrac{1}{2}\right)^2 + \left(\dfrac{1}{2}\right)^3 + \ldots + \left(\dfrac{1}{2}\right)^n + \ldots$

    (b) $1 + 2 + 2^2 + 2^3 + \ldots + 2^n + \ldots$

    (c) $1 + 2^2 + 2^4 + 2^6 + \ldots + 2^{2n} + \ldots$

    (d) $1 + 2 + 3 + 4 + \ldots + n + \ldots$

3. Which of the following **IS** a geometric series?

    (a) $1 + 1 + 2 + \dfrac{1}{2} + 3 + \dfrac{1}{3} + \ldots + n + \dfrac{1}{n} + \ldots$

    (b) $1 + \dfrac{1}{2} + \dfrac{1}{3} + \ldots + \dfrac{1}{n} + \ldots$

    (c) $1 + \dfrac{1}{2} + \dfrac{1}{4} + \dfrac{1}{8} + \ldots + \dfrac{1}{2^n} + \ldots$

    (d) $1 + \dfrac{1}{2} + \dfrac{1}{4} + \dfrac{1}{6} + \ldots + \dfrac{1}{2 \cdot n} + \ldots$

4. Which of the following *IS* a geometric series?

(a) $3 + 9 + 27 + 81 + 243 + \ldots + 3^n + \ldots$

(b) $3 + 6 + 9 + 12 + 15 + \ldots + 3 \cdot n + \ldots$

(c) $3 + \dfrac{3}{2} + 1 + \dfrac{3}{4} + \dfrac{3}{5} + \dfrac{1}{2} + \ldots + \dfrac{3}{n} + \ldots$

(d) $3 + 4 + 5 + 6 + 7 + \ldots + n + \ldots$

5. Which of the following *IS* a geometric series?

(a) $1 + 1.1 + 1.2 + 1.3 + 1.4 + 1.5 + \ldots + \left(1 + \dfrac{n-1}{10}\right) + \ldots$

(b) $1 + 1.1 + 1.21 + 1.331 + 1.4641 + \ldots + (1.1)^n + \ldots$

(c) $1 + 1.1 + 1.02 + 1.003 + 1.0004 + \ldots + \left(1 + \dfrac{n-1}{10^{n-1}}\right) + \ldots$

(d) $1 + 1.1 + 2.2 + 3.3 + 4.4 + \ldots + (n-1) \cdot (1.1) + \ldots$

6. Which of the following is *NOT* a geometric series?

(a) $1 + 0.1 + 0.001 + 0.0001 + \ldots + \dfrac{1}{10^{n-1}} + \ldots + 0.000000000000000000001$

(b) $1 + 0.2 + 0.03 + 0.004 + \ldots + \dfrac{n}{10^{n-1}} + \ldots + 0.00000009$

(c) $1 + 0.01 + 0.0001 + 0.000001 + \ldots + \dfrac{1}{10^{2n-2}} + \ldots$

(d) $1 + 0.2 + 0.04 + \ldots + (0.2)^n + \ldots$

7. Which of the following is *NOT* a geometric series?

(a) $1 + \dfrac{1}{2} + \dfrac{1}{4} + \ldots + \dfrac{1}{2^{n-1}} + \ldots$

(b) $1 + 8 + 27 + \ldots + n^3 + \ldots + 1000$

(c) $1 + 2^2 + 2^4 + 2^6 + \ldots + 2^n + \ldots + 256$

(d) $1 + 3 + 9 + \ldots + 3^n + \ldots + 729$

8.   Which of the following *IS* a geometric series?

    (a) $1 + 3 + 5 + \ldots + (2n - 1) + \ldots + 73$

    (b) $1 + 4 + 9 + \ldots + n^2 + \ldots + 10000$

    (c) $1 + 8 + 27 + \ldots + n^3 + \ldots + 1000$

    (d) $-1 + 3 - 9 + 27 + \ldots + (-1) \cdot (-3)^{n+1} + \ldots$

9.   Which of the following *IS* a geometric series?

    (a) $1 + 9 + 81 + \ldots + 9^n + \ldots$

    (b) $9 + 18 + 27 + \ldots + 9n + \ldots$

    (c) $-1 + 3 + 7 + 11 + \ldots + (-1 + 4 \cdot n) + \ldots + 99$

    (d) $1 + 0.2 + 0.03 + \ldots + \dfrac{n}{10^{n-1}} + \ldots + 0.00000009$

10.   Which of the following *IS* a geometric series?

    (a) $1 + 2 + 27 + \ldots + n^n + \ldots + 100^{100}$

    (b) $0.9 + 1.9 + 2.9 + \ldots + (n - 0.1) + \ldots + 99.9$

    (c) $10 + 9 + 8.1 + \ldots + 10 \cdot (0.9)^n + \ldots$

    (d) $1 + 1 + 2 + 2 + 3 + 3 + 4 + 4 + \ldots + n + n + \ldots + 100 + 100$

Answers

1.	B	2.	D	3.	C	4.	A	5.	B	6.	B
7.	B	8.	D	9.	A	10.	C				