Problems for Gateway #1: Evaluating the Sum of a Finite Geometric Series

1. The sum of the series: $1 + 2 + 4 + 8 + ... + 2^n + ...+ 256$ is equal to

(a) 512

(b) 1024

(c) $2^9 - 1$

(d) It is impossible to evaluate the sum as the series does not converge.

2. The sum of the series: $3 + 1 + \frac{1}{3} + ... + \frac{3}{3^n} + ... + \frac{1}{27}$ is equal to

(a) 1089

(b) $\frac{3\cdot\left[1-\left(\frac{1}{3}\right)^5\right]}{1-\left(\frac{1}{3}\right)}$

(c) $\frac{3\cdot\left[1-\left(\frac{1}{3}\right)^3\right]}{1-\left(\frac{1}{3}\right)}$

(d) It is impossible to evaluate the sum as the series does not converge.

3. The sum of the series: $0.9 + (0.9)^2 + + ... + (0.9)^n + ... + (0.9)^{100}$ is equal to

(a) $\frac{0.9\cdot\left[1-(0.9)^{100}\right]}{1-0.9}$

(b) $\frac{\left[1-(0.9)^{100}\right]}{1-0.9}$

(c) $\frac{0.9}{1-0.9}$

(d) It is impossible to evaluate the sum as the series does not converge.

4. The sum of the series: $1 + \left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)^4 + ... + \left(\frac{1}{2}\right)^n + ... + \left(\frac{1}{2}\right)^{100}$ is equal to

(a) $\frac{\left[1-\left(\frac{1}{2}\right)^{101}\right]}{1-\frac{1}{2}}$

(b) $\frac{\left(\frac{1}{2}\right)\cdot\left[1-\left(\frac{1}{2}\right)^{101}\right]}{1-\frac{1}{2}}$

(c) $\frac{\left[1-\left(\left(\frac{1}{2}\right)^2\right)^{51}\right]}{1-\left(\frac{1}{2}\right)^2}$

(d) It is impossible to evaluate the sum as the series does not converge.

5. The sum of the series: $9 + 27 + ... + 3^{n+1} + ... + 243$ is equal to

(a) 360

(b) $\frac{9\cdot\left[1-3^{17}\right]}{1-3}$

(c) $\frac{9\cdot\left[1-3^{16}\right]}{1-3}$

(d) It is impossible to evaluate the sum as the series does not converge.

6. The sum of the series: $1 - 1 + 1 + ... + (-1)^n + ... + (-1)^{100000}$ is equal to

(a) 1

(b) 0

(c) −1

(d) It is impossible to evaluate the sum with the information given.

7. The sum of the series: $3 + 9 + ... + 3^n + ... + 3^{22}$ is equal to

(a) $\dfrac{3\cdot\left[1-3^{21}\right]}{1-3}$.

(b) $\dfrac{\left[1-3^{23}\right]}{1-3}$

(c) $\dfrac{3\cdot\left[1-3^{22}\right]}{1-3}$

(d) It is impossible to evaluate the sum as the series does not converge.

8. The sum of the series: $1 + 7 + 49 + ... + 7^n + ... + 7^{100}$ is equal to

(a) $\dfrac{\left[1-7^{101}\right]}{1-7}$

(b) $7\cdot\dfrac{\left[1-7^{101}\right]}{1-7}$

(c) $\dfrac{\left[1-7^{100}\right]}{1-7}$

(d) It is impossible to evaluate the sum as the series does not converge.

9. The sum of the series: $1 + \dfrac{1}{8} + \dfrac{1}{8^2} + ... + \ + ... + \dfrac{1}{8^{100}}$ is equal to

(a) $\dfrac{8\cdot\left[1-\left(\frac{1}{8}\right)^{101}\right]}{1-\frac{1}{8}}$

(b) $\dfrac{\left(\frac{1}{8}\right)\cdot\left[1-\left(\frac{1}{8}\right)^{101}\right]}{1-\frac{1}{8}}$

(c) $\dfrac{\left[1-\left(\frac{1}{8}\right)^{102}\right]}{1-\left(\frac{1}{8}\right)}$

(d) $\dfrac{\left[1-\left(\frac{1}{8}\right)^{101}\right]}{1-\left(\frac{1}{8}\right)}$

10. The sum of the series: $1.728 + \ldots + (1.2)^{3n} + \ldots + (1.2)^{30}$ is equal to

(a) 36

(b) $\dfrac{1.728 \cdot \left[1 - 1.728^{10}\right]}{1 - 1.728}$

(c) $\dfrac{\left[1 - 1.728^{10}\right]}{1 - 1.728}$

(d) $\dfrac{1.728 \cdot \left[1 - 1.2^{10}\right]}{1 - 1.2}$

Answers

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