Problems for Gateway #1: Convergence and Divergence of an Infinite Geometric Series

1. The series that ***CONVERGES*** is:

(a) $1 + \left(\frac{1}{2}\right) + \left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)^3 + \left(\frac{1}{2}\right)^4 + \ldots$

(b) $1 + (1.2)^2 + (1.2)^4 + (1.2)^6 + \ldots$

(c) $1 + (1.2) + (1.2)^2 + (1.2)^3 + \ldots$

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

2. The series that ***CONVERGES*** is:

(a) $1 + (-3) + (-3)^2 + (-3)^3 + \ldots$

(b) $1 + 3 + 3^2 + 3^3 + 3^4 + \ldots$

(c) $1 + \left(\frac{-1}{3}\right) + \left(\frac{-1}{3}\right)^2 + \left(\frac{-1}{3}\right)^3 + \ldots$

(d) $1 + (-1) + (-1)^2 + (-1)^3 + (-1)^4 + \ldots$

3. The series that ***CONVERGES*** is:

(a) $\frac{1}{0.9} + \left(\frac{1}{0.9}\right)^2 + \left(\frac{1}{0.9}\right)^3 + \ldots$

(b) $0.9 + (0.9)^2 + (0.9)^3 + (0.9)^4 + \ldots$

(c) $1 + 9 + 9^2 + 9^3 + \ldots$

(d) $1.9 + (1.9)^2 + (1.9)^3 + (1.9)^4 + \ldots$

4. The series that ***DOES NOT CONVERGE*** is:

(a) $9 + 9\cdot\left(\frac{1}{2}\right) + 9\cdot\left(\frac{1}{2}\right)^2 + 9\cdot\left(\frac{1}{2}\right)^3 + \ldots$

(b) $9 + 9\cdot(0.9) + 9\cdot(0.9)^2 + 9\cdot(0.9)^3 + \ldots$

(c) $1.1 + 1.1\cdot(0.9) + 1.1\cdot(0.9)^2 + 1.1\cdot(0.9)^3 + \ldots$

(d) $1 + 1.1 + (1.1)^2 + (1.1)^3 + \ldots$

5. The series that ***DOES NOT CONVERGE*** is:

(a) $1 + (-0.1) + (-0.1)^2 + (-0.1)^3 + (-0.1)^4 + \ldots$

(b) $1 + \left(\frac{2}{1.1}\right) + \left(\frac{2}{1.1}\right)^2 + \left(\frac{2}{1.1}\right)^3 + \left(\frac{2}{1.1}\right)^4 + \ldots$

(c) $1 + \left(\frac{1}{1.1}\right) + \left(\frac{1}{1.1}\right)^2 + \left(\frac{1}{1.1}\right)^3 + \left(\frac{1}{1.1}\right)^4 + \ldots$

(d) $1 + (0.1) + (0.1)^2 + (0.1)^3 + (0.1)^4 + \ldots$

6. The series that ***CONVERGES*** is:

(a) $100 + 100\cdot\left(\frac{1}{2}\right) + 100\cdot\left(\frac{1}{2}\right)^2 + 100\cdot\left(\frac{1}{2}\right)^3 + 100\cdot\left(\frac{1}{2}\right)^4 + \ldots$

(b) $0.001 + 0.001\cdot(1.2)^2 + 0.001\cdot(1.2)^4 + 0.001\cdot(1.2)^6 + \ldots$

(c) $0.0001 + 0.0001\cdot(1.2) + 0.0001\cdot(1.2)^2 + 0.0001\cdot(1.2)^3 + \ldots$

(d) $\frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \ldots$

7. The series that ***CONVERGES*** is:

(a) $1 + (1.3) + (1.3)^2 + (1.3)^3 + \ldots$

(b) $10000 + 10000\cdot(0.99) + 10000\cdot(0.99)^2 + 10000\cdot(0.99)^3 + \ldots$

(c) $1.001 + (1.001)^2 + (1.001)^3 + (1.001)^4 + \ldots$

(d) $1 + (-1) + (-1)^2 + (-1)^3 + (-1)^4 + \ldots$

8. The series that ***CONVERGES*** is:

(a) $\frac{1}{0.99} + \left(\frac{1}{0.99}\right)^2 + \left(\frac{1}{0.99}\right)^3 + ...$

(b) $9.9 + (9.9)^2 + (9.9)^3 + (9.9)^4 + ...$

(c) $1 + \frac{99}{100} + \left(\frac{99}{100}\right)^2 + \left(\frac{99}{100}\right)^3 + ...$

(d) $1.9 + (1.9)^2 + (1.9)^3 + (1.9)^4 + ...$

9. The series that ***DOES NOT CONVERGE*** is:

(a) $9 + 9\cdot\left(\frac{1}{2}\right) + 9\cdot\left(\frac{1}{2}\right)^2 + 9\cdot\left(\frac{1}{2}\right)^3 + ...$

(b) $9 + 9\cdot(0.9) + 9\cdot(0.9)^2 + 9\cdot(0.9)^3 + ...$

(c) $1.1 + 1.1\cdot\left(\frac{1}{1.01}\right) + 1.1\cdot\left(\frac{1}{1.01}\right)^2 + 1.1\cdot\left(\frac{1}{1.01}\right)^3 + ...$

(d) $1 + \frac{1}{0.99} + \left(\frac{1}{0.99}\right)^2 + \left(\frac{1}{0.99}\right)^3 + ...$

10. The series that ***DOES NOT CONVERGE*** is:

(a) $1 + (-2.1) + (-2.1)^2 + (-2.1)^3 + (-2.1)^4 + ...$

(b) $1 + \left(\frac{2}{2.1}\right) + \left(\frac{2}{2.1}\right)^2 + \left(\frac{2}{2.1}\right)^3 + \left(\frac{2}{2.1}\right)^4 + ...$

(c) $1 + \left(\frac{1}{1.1}\right) + \left(\frac{1}{1.1}\right)^2 + \left(\frac{1}{1.1}\right)^3 + \left(\frac{1}{1.1}\right)^4 + ...$

(d) $1 + (0.1) + (0.1)^2 + (0.1)^3 + (0.1)^4 + ...$

Answers

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