

201-203-RE - Practice Set #19: Test for Divergence and Geometric Series

Determine whether the following series converge or diverge, justifying your answers. If a series converges, find its sum.

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

$$(6) \sum_{n=0}^{\infty} \frac{(2+3n)(4+n^2)}{(2+n^2)(1+n)}$$

$$(11) \sum_{n=0}^{\infty} \frac{n+n^3}{3+n}$$

$$(2) \sum_{n=0}^{\infty} \frac{5}{3} \left(\frac{1}{2}\right)^n$$

$$(7) \sum_{n=0}^{\infty} 6 \left(-\frac{2}{3}\right)^n$$

$$(12) \sum_{n=0}^{\infty} \frac{5}{3^n}$$

$$(3) \sum_{n=0}^{\infty} 250(1.2)^n$$

$$(8) \sum_{n=0}^{\infty} 20 \left[\left(\frac{1}{4}\right)^n - \left(\frac{1}{5}\right)^n \right]$$

$$(13) \sum_{n=0}^{\infty} \frac{3^{n+1}}{4^n}$$

$$(4) \sum_{n=1}^{\infty} 125(0.2)^n$$

$$(9) \sum_{n=0}^{\infty} \frac{1}{4} \left(\frac{5}{2}\right)^n$$

$$(14) \sum_{n=0}^{\infty} 4 \cdot \frac{2^{n+1}}{3^n}$$

$$(5) \sum_{n=0}^{\infty} \frac{4n^2 - n^3}{4 + n^2}$$

$$(10) \sum_{n=0}^{\infty} \frac{\sqrt{9+n^2}}{n+1}$$

$$(15) \sum_{n=1}^{\infty} \frac{2^n}{5^{n+1}}$$

ANSWERS:

(1) Diverges

(6) Diverges

(11) Diverges

(2) 10/3

(7) 18/5

(12) 15/2

(3) Diverges

(8) 5/3

(13) 12

(4) 125/4

(9) Diverges

(14) 24

(5) Diverges

(10) Diverges

(15) 2/15