

MATH 201
ÉNONCÉS DES EXERCICES 2

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(1) Etudier la convergence des séries suivantes :

$$\blacktriangleright \sum_{n=1}^{\infty} \frac{2^n}{n+1}$$

$$\blacktriangleright \sum_{n=1}^{\infty} \frac{n^3}{3^{n^2}}$$

$$\blacktriangleright \sum_{n=1}^{\infty} \frac{(2n)!}{(n!)^2}$$

$$\blacktriangleright \sum_{n=1}^{\infty} \frac{n}{(n-1)!}$$

$$\blacktriangleright \sum_{n=1}^{\infty} \frac{n^2 2^n}{3^{2n}}$$

$$\blacktriangleright \sum_{n=1}^{\infty} \frac{n}{e^{n^2}}$$

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

$$\blacktriangleright \sum_{n=1}^{\infty} \frac{3^n}{n!}$$

$$\blacktriangleright \sum_{n=1}^{\infty} \frac{n^n}{\pi^n n!}$$

$$\blacktriangleright \sum_{n=1}^{\infty} \frac{e^n}{n^n}$$

$$\blacktriangleright \sum_{n=1}^{\infty} \frac{3^n}{(1+n)^n}$$

$$\blacktriangleright \sum_{n=1}^{\infty} \left(\frac{\ln n}{n} \right)^n$$

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

$$\blacktriangleright \sum_{n=1}^{\infty} \left(\frac{1}{\ln n} \right)^n$$

$$\blacktriangleright \sum_{n=1}^{\infty} \frac{n^3}{2^n}$$

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

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

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

(2) Etudier la convergence des séries suivantes :

$$\blacktriangleright \sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{2n-1}$$

$$\blacktriangleright \sum_{n=1}^{\infty} (-1)^n \frac{n^3}{4^n}$$

$$\blacktriangleright \sum_{n=1}^{\infty} (-1)^n \frac{\sqrt{n}}{n+1}$$

$$\blacktriangleright \sum_{n=1}^{\infty} (-1)^{n+1} \frac{n!}{1 \cdot 3 \cdot 5 \cdot \dots \cdot (2n+1)}$$

$$\blacktriangleright \sum_{n=1}^{\infty} (-1)^n \frac{n}{5^n}$$

$$\blacktriangleright \sum_{n=1}^{\infty} \frac{(-3)^{n+1}}{2^{2n}}$$

(3) Déterminer les domaines des fonctions suivantes :

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

$$\blacktriangleright \sum_{n=0}^{\infty} \left(\frac{x}{3} \right)^n$$

$$\blacktriangleright \sum_{n=0}^{\infty} \left(\frac{x+1}{4} \right)^n$$

$$\blacktriangleright \sum_{n=1}^{\infty} (-1)^n \frac{(x+1)^n}{n}$$

$$\blacktriangleright \sum_{n=0}^{\infty} 3(x-1)^n$$

$$\blacktriangleright \sum_{n=1}^{\infty} \frac{(2x+1)^n}{n}$$

$$\blacktriangleright \sum_{n=0}^{\infty} \frac{(x/2+1)^n}{n!}$$

$$\blacktriangleright \sum_{n=0}^{\infty} n^2 x^n$$