

V Exercise Lesson

Monday, October 27th 2014

Ex. 1 Evaluate, if they exist, the following limits:

- 1) $\lim_{n \rightarrow +\infty} \frac{n+1}{n^2}$
- 2) $\lim_{n \rightarrow +\infty} \frac{n^3+1}{n^2+3n^3}$
- 3) $\lim_{n \rightarrow +\infty} \frac{-n^4+2}{n^2+n} + 3$
- 4) $\lim_{n \rightarrow +\infty} \frac{\ln(n+1)}{n^2}$
- 5) $\lim_{n \rightarrow +\infty} \frac{(-1)^n n + 5}{e^n + 5}$
- 6) $\lim_{n \rightarrow +\infty} \left(\frac{2}{3}\right)^n$
- 7) $\lim_{n \rightarrow +\infty} \frac{(-1)^n + 1}{n}$
- 8) $\lim_{n \rightarrow +\infty} \frac{(-1)^n + 1}{2}$

Ex. 2 Evaluate, if they exist, the following limits:

- 1) $\lim_{n \rightarrow +\infty} \left(\frac{n+1}{n}\right)^{2n}$
- 2) $\lim_{n \rightarrow +\infty} \left(\frac{2n-1}{2n}\right)^n$
- 3) $\lim_{n \rightarrow +\infty} \left(\frac{n-1}{n}\right)^{2n}$
- 4) $\lim_{n \rightarrow +\infty} \frac{2^n}{n^2 + n^4}$

Ex. 3 For each of the following series determine if it converges or diverges.
In case of convergent series calculate the sum.

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

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

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

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

$$5) \quad \sum_{n=0}^{+\infty} \frac{3^n + 1}{2^{3n}}$$