Babeş-Bolyai University, Faculty of Mathematics and Computer Science

Bachelor, Computer Science, Groups 911-917, Academic Year 2016-2017

**Mathematical Analysis**

**Seminar 8**

**1.** Study whether the following improper integrals are convergent or divergent:

$$\text{a) } \int_0^1 \frac{1}{2x^2 - x^3}dx, \quad \text{b) } \int_0^{\frac{\pi}{2}} \frac{1}{\cos x}dx, \quad \text{c) } \int_1^{+\infty} \frac{1}{(1+x^2)\sqrt{x}}dx, \quad \text{d) } \int_1^3 \frac{x^3}{\sqrt{x-1}(3-x)^2}dx.$$

**2.** Use the Integral Test to study if the following series are convergent or divergent:

$$\text{a) } \sum_{n\geq 2} \frac{1}{n(\ln n)^2}, \quad \text{b) } \sum_{n\geq 1} \frac{\ln n}{n\sqrt{n}}, \quad \text{c) } \sum_{n\geq 1} \frac{n^2}{1+n^3}, \quad \text{d) } \sum_{n\geq 1} ne^{-n}.$$