

**KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS**  
**DEPARTMENT OF MATHEMATICS AND STATISTICS**  
**MATH 102 - QUIZ 5**

Name:

Student ID #:

**Question 1.** Find, if they exist, the limit of the following sequences

a) (2-points)  $a_n = 2 \ln(2n) - \ln(n^2 + 1)$ ,

b) (1-point)  $a_n = n \cos\left(\frac{1}{n}\right) - (-1)^n n$

**Question 2.** (4-points) Find the sum of the sequence  $\sum_{i=2}^{\infty} \frac{2^n - (-1)^n}{3^n}$ .

**Question 3.** (3-points) Decide whether the series  $\sum_{n=1}^{\infty} n e^{-n}$  converge or diverge.

**Your Solution.**