Your Name / Ad - Soyad

(**time:60**)

Signature / İmza

Student ID # / Öğrenci No

(**mavi tükenmez!**)

Problem	1	2	3	4	Total
Points:	25	25	25	25	100
Score:					

1. (a) (13 Points) $\int \frac{9x^3 - 3x + 1}{x^3 - x^2}\, dx = ?$

(b) (12 Points) Evaluate the improper integral $\int_{-\infty}^{+\infty} 2x e^{-x^2}\, dx$.

2. (a) (12 Points) Suppose $a_n = \dfrac{\ln(n+1)}{\sqrt{n}}$. Does the sequence $\{a_n\}_{n=1}^{\infty}$ converge? If it converges, find its limit.

(b) (13 Points) Find a formula for the nth partial sum s_n and find the sum of the series

$$\frac{1}{2\cdot 3}+\frac{1}{3\cdot 4}+\frac{1}{5\cdot 6}+\cdots+\frac{1}{(n+1)\cdot(n+2)}+\cdots.$$

3. (a) (12 Points) Does the series $\sum_{n=0}^{\infty} \frac{e^n}{e^n + n}$ converge or diverge? Name the test you use.

(b) (13 Points) Does the series

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

converge? If it converges, find its sum.

4. (a) (13 Points) Determine if $\sum_{n=1}^{\infty} \frac{n2^n(n+1)!}{3^n n!}$ converges or diverges. Give reason.

(b) (12 Points) Determine if $\sum_{n=1}^{\infty} \frac{n+1}{n^2\sqrt{n}}$ converges or diverges. Give reason.