

Name:
ID. No.

Eskişehir Osmangazi University - Electrical Engineering Department
Advanced Calculus
1st Midterm Examination - Fall 2013

All answers must be written in the appropriate neighborhoods of the questions. Anything written elsewhere will not be graded. Use the back side of the exam sheet if you need scratch paper.

Question 1.

[25 pts.-no partial credits] Let $M = \{z : |z + 1| \geq |z - 1|\}$ and $N = \{z : |2z + 1| \geq 3\}$. **True or False?** (Write **T** or **F** in the box next to each statement)

$0.1 \in M$ ☒ $0.1 \in N$ ☐ $0.2 \in M$ ☒ $0.2 \in N$ ☐

$1 + i \in M$ ☒ $1 + i \in N$ ☒ $1.2 + 0.1i \in M$ ☒ $1.2 + 0.1i \in N$ ☒

$i \in M$ ☒ $i \in N$ ☐ $-i \in M$ ☒ $-i \in N$ ☐

Question 2.

[25 pts] Evaluate the following (express the results in cartesian form; answers should be free of trigonometric, logarithmic, hyperbolic and exponential terms):

a) $\frac{\sin(0.5+i)}{1+i}$ **0.885 + 0.145i**

b) $\frac{e^{\log(1+i)}}{2i}$ **0.5 - 0.5i**

c) $\text{Arg } e^{1+i}$ **1**

d) $\frac{\text{Log } e^{1+i}}{1-i}$ **i**

e) $(2i)^8$ **256**

Question 3.

[25 pts] Evaluate

$$\int_D (2x + 4yi) dz$$

where D is a straight line with initial point at $1 + i$ and final point at $3 + i$. **8 + 8i**

Question 4.

[25 pts] For positively oriented $C : |z| = 2$ evaluate

$$\int_C \frac{z^3}{(z - 1 + i)^3} dz$$
 18.84 + 18.84i

Good Luck
A. Karamancıoğlu