 YTU – Faculty of Chemical and Metallurgical Engineering, Questions Sheet	NOTE CHART						
	1. q	2. q	3. q	4. q	5. q	6. q	Total
Student Name and Surname							
Students Number							
Section						Exam Date	15/05/ 2020
Course Name	COMPLEX ANALYSIS OPEN BOOK EXAM	Group Number		Exam Duration	240 min	Exam Room	
Course Instructor Name and Surname	PROF. DR. İNCİ ALBAYRAK				Signature		
Student Disciplinary Regulations "and to make or attempt to make copies of exams to" the actual perpetrators are suspended from one or two semesters. (YÖK; 2547 Student Disciplinary Regulations, 9. Article)							

1) (15 pts) D is a region on the complex plane.

Let $D^* = \{\bar{z} \mid \forall z \in D\}$. If $f(z): D \rightarrow \mathbb{C}$ is a differentiable function, $f^*: D^* \rightarrow \mathbb{C}$, show that $f^*(z) = \overline{f(\bar{z})}$ is differentiable.

2) Let $u(x, y), v(x, y)$ harmonic functions in region D on the plane. And let

v is a harmonic conjugate function of u .

a) (10 pts) Show that $u^2 - v^2$ is a harmonic function in D .


And show that $2uv$ is a harmonic conjugate of $u^2 - v^2$.

b) (10 pts) Find the harmonic conjugate function of $u^3 - 3uv^2$.

3) a) (8 pts) Find the values of $(-1 - \sqrt{3}i)^{1/4}$.

b) (7 pts) Sketch the following region on the complex plane

$$|z - 1 + i| < 2, \text{Arg}(z) > \frac{\pi}{2}$$

 YTU – Faculty of Chemical and Metallurgical Engineering, Questions Sheet	NOTE CHART						
	1. q	2. q	3. q	4.q	5. q	6.q	Total
Student Name and Surname							
Students Number							
Section						Exam Date	15/05/ 2020
Course Name	COMPLEX ANALYSIS OPEN BOOK EXAM	Group Number		Exam Duration	240 min	Exam Room	
Course Instructor Name and Surname	PROF. DR. İNCİ ALBAYRAK				Signature		
Student Disciplinary Regulations "and to make or attempt to make copies of exams to" the actual perpetrators are suspended from one or two semesters. (YÖK; 2547 Student Disciplinary Regulations, 9. Article)							

4) (15 pts) Recall that $\cos z$ for $z \in \mathbb{C}$ is defined by $\cos z = \frac{e^{iz} + e^{-iz}}{2}$

Find all complex numbers z satisfying the equation $\cos z = 3$.

5) (15 pts) Compute the principle value of $(\sqrt{3} - i)^i$.

6) Let γ be the positively oriented circle with radius 1 and center i .

Evaluate the following counter integrals

a) (10 Pts) $\oint_{\gamma} \bar{z} dz = ?$

b) (10 Pts) $\oint_{\gamma} \frac{dz}{z^2 - 2} = ?$