# ÇANKAYA UNIVERSITY
## Department of Mathematics and Computer Science

### MATH 351 Complex Analysis I
Second Midterm
August 4, 2008
9:00-10:30

Surname : _____

Name : _____

ID # : _____

Department : _____

Section : _____

Instructor : _____

Signature : _____

- The exam consists of 6 questions.
- Please read the questions carefully and write your answers under the corresponding questions. Be neat.
- Show all your work. Correct answers without sufficient explanation might <u>not</u> get full credit.
- Calculators are <u>not</u> allowed.

## *GOOD LUCK!*

Please do <u>not</u> write below this line.

| Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | TOTAL |
|----|----|----|----|----|----|-------|
|    |    |    |    |    |    |       |
| 11 | 18 | 20 | 20 | 16 | 20 | 105 |

**1.** Find all the zeros of the function $f(z) = 2 + \cos z$. (Hint: if they exist, they must be nonreal.)

**2.** Find all of values of $\tan^{-1}(1+i)$.

**3.** Evaluate the line integral $\int_C |z|^2 \, dz$ where $C$ is the line segment from the point $0$ to the point $1 + i$.

**4.** By finding an antiderivative, evaluate the integral
$$\int_0^{\pi+2i} \cos\left(\frac{z}{2}\right)\ dz.$$

**5.** Use Cauchy's Integral Formula to evaluate $\displaystyle\int_{|z-1|=1} \frac{\cos\left(2\pi z\right)}{z^2 - 1}\, dz$ where the integration path is oriented in the standard counterclockwise direction.

**6.** Find the value of the integral $\int_C \dfrac{z-b}{z-a}\, dz$ where $C$ is the unit circle traversed once counterclockwise. Be sure to consider the cases $|a| < 1$ and $|a| > 1$.