Second Exam-MATH 413-(Complex Analysis)

23\6\1435H-2014- Semester II

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Name: Co:

Q1: True or False: (3 Marks)

1- If z = x + iy, then $Re(e^z) = \cos y$.

- 2- $Im(\log z) = \arg z$.
- 3- The sector $\frac{-\pi}{6} < \arg z < \frac{\pi}{6}$ is a simply connected domain. (try to sketch it)
- 4-For any $z \in C$, $-1 \leq \sin z \leq 1$.
- 5- If w_1 and w_2 are two values of log z, then $Re(w_1) = Re(w_2)$.

6- If z(t), $a \le t \le b$, is a parameterization of a contour C and z(a) = z(b) then C is a simple closed contour.

Q2: Fill the blanks (3 Marks)

3- If f(z) is a polynomial function and C is a simple closed contour, then

$$\int_C f(z)dz = -----$$

4- $z(t) = e^{it^2}$, $0 \le t \le \sqrt{2\pi}$ is a parameterization for a ---- with radius ---- and centered at the ----

Q3: Find the solutions of the equation

(1.5 Marks)

 $e^w = -2$

<u>Q4:</u> Find

(3.5 Marks)

- a) the Principle logarithm of $\log(6-6i)$
- b) the value of i^{2i}
- c) the derivative of tanh(iz 2)

<u>Q5:</u> Find the solutions of the equation

(2 Marks)

(1.5 Marks)

 $\sin z = 5$

<u>Q6:</u> Find the upper bound of

 $\int_{C} \frac{e^{z}}{z+1}$

where C is the circle |z| = 4.

<u>Q7</u>: Find the value of

(2 Marks)

$$\int_{C} \frac{2z+1}{z^2+z} dz$$

where C is the circle in positive direction with

(a)
$$|z| = \frac{1}{2}$$
, (b) $|z + 3i| = 1$

<u>Q8:</u> Evaluate

(2.5 Marks)

$$\int_{C} \frac{1}{z^{\frac{1}{2}}}$$
 where C the line segment between $z = i$ and $z = 9$.

<u>Q 9:</u> Show that

(1 Mark)

$$\overline{e^z} = e^{\overline{z}}$$

Good Luck 😊