Please answer the questions showing your work completely and using correct grammar. No use of electronic devices allowed.

Name and date: _____

1. Prove the statement.
   If f is surjective and g is surjective then $f \circ g$ is surjective.

2. Prove $(0, \infty) \sim (0, 3)$.

3. Prove: Let $\alpha = \sup(A)$. If $\alpha \notin A$ then A is infinite.

4. Solve for all $x \in \mathbb{C}$ for

- $x^3 = 1$

- $x^2 = i$

	0	$\pi/6$	$\pi/4$	$\pi/3$	$\pi/2$
sin	0	$1/2$	$\sqrt{2}/2$	$\sqrt{3}/2$	1
cos	1	$\sqrt{3}/2$	$\sqrt{2}/2$	$1/2$	0
tan	0	$1/sqrt3$	1	$\sqrt{3}$	undefined

5. Find the following limit and prove your answer is correct using the $\varepsilon - N$ definition from class:

$$\lim_{n\to\infty} \frac{3n+2}{3n+4}$$

6. Prove: If (a_n) and (b_n) are convergent then $(a_n + b_n)$ is convergent. State the definition of convergence of a sequence.

7. Use the MCT to prove convergence for a recursively defined sequence. Let $a_1 = 8$, and $a_{n+1} = 5 - \frac{4}{L}$ for all $n \in \mathbb{N}$. Make certain to state the MCT. Also compute the limit.