MAT 313 Abstract Algebra 2002
Midterm II

Name:_____

I.D.:_____

Based on the material in Chapters 0-5. Please state clearly the properties (theorems, lemmas, etc.) that you are using. All problems are taken from the 5th edition of the textbook.

1	2	3	4	5	6	7	8	TOTAL
12 pts	2 pts	6 pts	3 pts	4 pts	6 pts	6 pts	11 pts	50 pts

Problem 1 (i) (3 points) Find the order of the group $U(40)$.
(ii) (3 points) Determine whether $U(40)$ is cyclic or not.
(iii) (3 points) Problem 41 in Ch.3, p. 70.
(iv) (3 points) Problem 42 in Ch.3, p. 70.

Problem 2 (2 points) Problem 16 in Ch.3, p. 68.

Problem 3 Problem 30 in Ch.3, p. 69.
(i) (3 points) First question (Hint: Use mathematical induction).
(ii) (3 points) Second question.

Problem 4 (3 points) Problem 22 in Ch.3, p. 69.

Problem 5 (4 points) Problem 27 in Ch.3, p. 69 (Hint: Use that $a^4 = e$ and $b^2 = e$).

Problem 6 (i) (3 points) Problem 5 on p. 90.
(ii) (3 points) Problem 6 on p. 90 (Hint: Use part (i)!).

Problem 7 (6 points) Problem 16 on p. 90 (Hint: First prove that if a and b are elements of finite order in Abelian group G, then ab is also an element of finite order).

Problem 8 (i) (1 points) Problem 2 in Ch.5, p. 111.
(ii) (1 points) Problem 11 in Ch.5, p. 112.
(iii) (2 points) Problem 17 in Ch.5, p. 112 (do it for element α only).
(iv) (4 points) Problem 25 in Ch. 5, p. 112 (Hint: Use parts (i)-(ii) and count carefully!).
(v) (3 points) Problem 26 in Ch.5, p. 113 (Hint: Use part (i)!).