M E T U Department of Mathematics

	Ι	Discrete Mathematics	
MidTerm I			
Code	: Math 112	Last Name :	
Acad. Year	: 2011-2012	Name :	Student No :
Semester	: Spring	Department ·	
Instructor	: Finashin, Okutmuştur Önal Seven	Signaturo	
Date	: 27.03.2012	Signature .	
Time	: 17.40	4 Questions on 4 Pages	
Duration	: 90 minutes	Total 60 Points	
1 2	3 4		

READ THE PROBLEMS CAREFULLY AND GIVE DETAILED WORK

1. (15 pts) a) Find the number of monomials (monomial is a summand of the form $cx^iy^jz^k$, where c is a constant) in the expansion of $(x + y + z + 1)^{100}$.

b) Find the coefficient of x^8 in $(x^2 + x + 2)^7$.

c) How many telephone numbers can be formed with two digits 1, two digits 2, and three digits 3, so that two (but not all three) digits 3 stand together ?

- 2. (15 pts) Suppose that a department contains 10 women and 6 men.
- a) Three couples are married. In how many ways it could happen?

b) How many ways are there to form a committee with 5 members if it must have more women than men ?

c) How many ways are there to arrange all 16 department members in a row, so that no two men stand next to each other ?

3. (15 pts) a) Four fair coins are tossed. Find the probability that at least three of them land heads up ?

b) Suppose we flip a coin four times. What is the probability that exactly three heads occur given that at least one head occurred ?

c) What is more probable: rolling a total of 8 when two dice are rolled or rolling a total of 8 when three dice are rolled ?

4. (15 pts) Two distinct integers $1 \le a, b \le 100$ are chosen at random.

a) What is the probability that one of them is not greater than 10 ? Estimate whether the probability is less or more than 20% ?

b) What is the probability that one of these two numbers is divisible by 3, or 5?