



Department of Basic Sciences

Disc. Math II - First Exam - Semester (2) - 2014/2015

(1) Use the Chinese Remainder Theorem to solve the system

[6]

$$\begin{aligned}x &\equiv 9 \pmod{4} \\x &\equiv -2 \pmod{15}.\end{aligned}$$

(2) Show that the number $6601 = 7 \times 23 \times 41$ is a Carmichael number.

[5]

(3) Solve the linear Congruence $12x \equiv 7 \pmod{5}$. [3]
DO NOT USE TRIAL-ERROR METHOD.

(4) Find the coefficient of x^3y^2 in the expansion of $(x - \frac{y}{5})^5$. [2]

(5) In a soccer tournament, the soccer teams are divided into 11 groups. What is the minimum number of soccer teams for which at least 5 teams belong to the same group? [2]

(6) A store that sells movies contains 40 action movies, 20 comedy movies, 10 horror movies, and 30 romance movies.

A. In how many ways can a person select, in order, 3 movies? [1]

B. In how many ways can a person select, in order, 3 movies such that the third movie is a romance movie? [2]

C. In how many ways can a person select, without order, 2 comedy movies? [1]

D. In how many ways can a person select, without order, 2 movies at least one of them is neither horror nor comedy? [3]