

Course topics:

Graphs

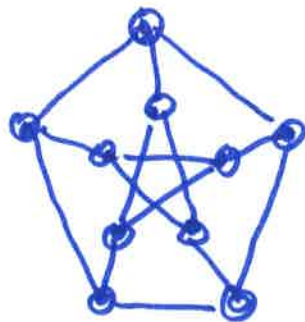
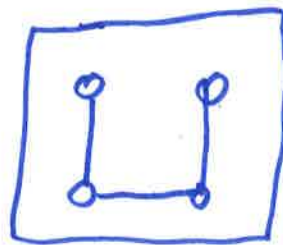
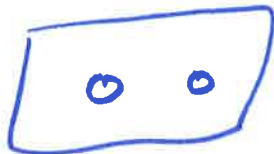
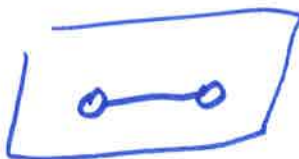
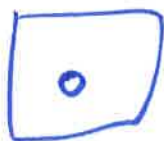
Counting. Binomial coefficients.

Recurrence relations.

Logic. Symbols. Proofs.

Sets. Functions. Relations.

Some graphs:



← the
Petersen
graph

Some counting problems :

① How many different license tags can there be if each tag consists of 3 letters followed by 3 digits?

② A club has six members. How many ways are there to choose three members to be on a committee? That is, how many different choices of three members are possible, to form the committee?

③ Four people meet and each pair shake hands. How many handshakes does that make?

The binomial theorem and Pascal's Triangle.

$(x+y)^0$				1											
$(x+y)^1$				1		1									
$(x+y)^2$			1		2		1								
$(x+y)^3$			1		3		3		1						
$(x+y)^4$			1		4		6		4		1				
$(x+y)^5$			1		5		10		10		5		1		
$(x+y)^6$			1		6		15		20		15		6		1

A recurrence relation.

$$a_0 = 1$$

$$a_1 = 2$$

$$\text{If } n \geq 2, \quad a_n = 5a_{n-1} - 6a_{n-2}$$

Sets, functions, relations.

$\mathbb{N} = \{1, 2, 3, \dots\}$ the set of natural numbers

$f: \mathbb{N} \rightarrow \mathbb{N}$, $f(x) = 2x - 1$,

a function from \mathbb{N} to \mathbb{N} .

$x \leq y$, a relation on \mathbb{N}

(a relation from \mathbb{N} to \mathbb{N})

Logic, Symbols, Proofs.

Homework

0.1: The True-False questions, 1-11;

1(a-g), 2(a-g), 3(a-g), 4(a-c, e, g),

5(a-g), 6(a, c, h, l), 7(a, c, e, g).

0.2: The True-False questions; 1, 3, 4, 14.