Math 55 - Section
Homework 8
Thursday, November 10, 2016

1, 2, 3, 4, 5

1

(a) How many subgraphs are there of the complete graph K_n? (Your answer may involve a summation.)

(b) How many of these are induced subgraphs?

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2

(a) How many automorphisms are there of K_n, where $n \geq 0$?

(b) How many automorphisms are there of the path P_n, where $n \geq 1$?

(c) How many automorphisms are there of the cycle C_n, where $n \geq 3$? (Be careful! Small cases sometimes differ from the general formula.)

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3 The *d-dimensional cube* Q_d ($d \geq 0$) has 2^d vertices labelled by the 2^d lists of 0s and 1s of length d, with edges joining each pair of vertices whose lists differ in exactly one position.

(a) How many edges are there in Q_d?

(b) For $0 \leq c \leq d$, how many induced subgraphs of Q_d are isomorphic to Q_c? (The answer to part (a) should emerge as a special case of part (b).)

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4 How many automorphisms are there of Q_d?

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5 Write a formula for the number of automorphisms of $K_a + K_b$. (Be careful! There are two cases to consider.)

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