Vivian Choong
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Attendance Quiz #14

(1) who were the two geniuses who proved the impossibility of a formula for solving a quintic equation? Galois and Cayley

(2) Find a way to place 31 domino pieces and cover completely an 8×8 square. Not possible. A domino placed on the chessboard will always be on top of a black square and white square. Therefore, a collection of dominos placed on the board will cover an equal number of squares of each color. If two white squares are removed, then 30 squares will be white and 32 will be black, so it is impossible.

(3) At what age did the above geniuses die?
Galois died at 19, Cayley died at 73

(4) What university did the most in classifying so-called simple groups?
I do not know.

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Attendance for Dr. Z.'s MathHistory for Lecture 14 (due no later than 15 minutes after class)

NAME: (print!) Vivian Chong

Email to DrZlinear@gmail.com right after class

Subject: p14

with an attachment p14FirstLast.pdf

Part I: List all the "attendance questions" during the lecture, followed by your answers.

Part II:

1. Perform the following permutation-product

$$\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ 4 & 5 & 7 & 6 & 1 & 2 & 3 \end{pmatrix} \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ 3 & 1 & 2 & 6 & 7 & 4 & 5 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ 6 & 7 & 5 & 4 & 3 & 1 & 2 \end{pmatrix}$$

2. Let

$$\pi = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 1 & 2 & 3 \end{pmatrix} \quad ,$$

find $\pi, \pi^2, \ldots$ until you get the identity permutation.

$$\pi^2 = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 1 & 2 & 3 \end{pmatrix} \begin{pmatrix} 1 & 2 & 3 & 4 \\ 4 & 1 & 2 & 3 \end{pmatrix} = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 3 & 4 & 1 & 2 \end{pmatrix}$$

$$\boxed{\pi^4 =} \begin{pmatrix} 1 & 2 & 3 & 4 \\ 3 & 4 & 1 & 2 \end{pmatrix} \begin{pmatrix} 1 & 2 & 3 & 4 \\ 3 & 4 & 1 & 2 \end{pmatrix} = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 1 & 2 & 3 & 4 \end{pmatrix}$$

3. Express the permutation

$$\begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 3 & 1 & 2 & 5 & 4 \end{pmatrix} \quad ,$$

as a product of disjoint cycles. What is the smallest i such that π^i is the identity permutation?

$(1\,3\,2)(4\,5)$ I do not know the smallest i.

4. Find π^{-1} if

$$\pi = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 3 & 1 & 2 & 5 & 4 \end{pmatrix} \quad .$$

$$\pi^{-1} = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 2 & 3 & 1 & 5 & 4 \end{pmatrix}$$