METU MATHEMATICS SOCIETY

ARE YOU REALLY GOOD AT MATH ?

If you believe the answer is yes, then a challenge is waiting for you . Due on the 28th of April,2014

Solve one of the following questions (solve both if you dare☺)

QUESTION 1

Consider a triangle ABC and points X_n such that $X_{3n} \in BC$, $X_{3n+1} \in CA$, $X_{3n+2} \in AB$ with the property that X_{3n+1} is the reflection of X_{3n} in the internal bisector of the angle C, X_{3n+2} is the reflection of X_{3n+1} in the internal bisector of the angle A, X_{3n+3} is the reflection of X_{3n+2} in the internal bisector of the angle B for each $n \in \mathbb{Z}$. Prove that $X_n = X_{n+6}$ for all $n \in \mathbb{Z}$.

Try to formulate and prove a similar result with a quadrangle instead of a triangle.

QUESTION 2

Find the number of ways of placing 20 checkers on a 10×10 chessboard such that each cell contains at most one checker and each column and each row contain at total of exactly two checkers.

Please write your solutions out clearly and bring them to the Mathematics Society room (Math building 1st floor M101). Solutions and winners will be announced on the 30th of April.The Mathematics Society is grateful to Cem Tezer and Ali Doğanaksoy for their meticulous work on preparing these questions. None of these questions can be used in anyway without permission of the society. For more information, visit www.mathc.metu.edu.tr or send an e-mail to mathclub@metu.edu.tr. For each question, the winner will be awarded.

☺ Good Luck ☺