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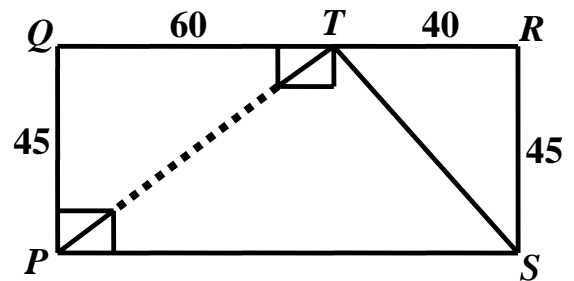
**INTERNATIONL MATHENATICS AND SCIENCE OLYMPIAD
FOR PRIMARY SCHOOLS (IMSO) 2005**
Mathematics Contest in Taiwan, Essay Problems

Name: _____ School: _____ Grade: _____ ID number: _____

Answer the following 10 questions, and show your detailed solution in the space provided after each question. Each question is worth 4 points.

Time limit: 60 minutes.

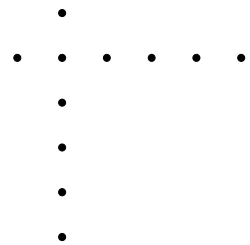
1. A rectangle $PQRS$ with $PQ = 45$ and $PS = 100$ is cut into 4500 squares of side 1. T is a point on QR such that $QT = 60$. Of these 4500 squares, how many are cut by lines PT and TS ? (A square does not cut by line if the line only passing through its vertices.)



2. In a mathematical competition consisting of 25 problems, 8 marks are given for each correct response, 0 marks for each incorrect response and each no response is awarded 3 marks. Tom scored 121 marks in this competition. What is the smallest number of incorrect responses he could have?

3. How many numbers less than 1000 have the product of their digits equal to 63?

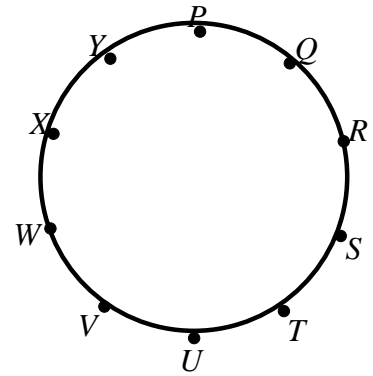
4. How many triangles can be drawn using the points in the diagram as vertices?



5. The integers 1, 2, 3, ..., 2005 are written on the board. What is the smallest number of these integers that can be wiped off so that the product of the remaining integers ends in 8?

6. How many numbers less than 4000 can be formed with the digits 2, 3, 4, 5 and 6 if no digit is used more than once in a number?
7. In a soccer tournament eight teams play each other once, with two points awarded for a win, one point for a draw and zero for a loss. How many points must a team score to that it is in the top three (i.e. has more points than at least five other teams)?
8. Two players take it in turns to choose from 25 numbered counters, each labeled with a different odd number from 1 to 49. When one player chooses a counter labeled X , the next player must choose the counter whose label is the greatest odd factor of $99 - X$. No matter what the first counter be taken, what is the least number of counters will remain when the game ends?

9. Ten points, P, Q, R, \dots, Y , are equally spaced around a circle of radius one. What is the difference in the lengths of the lines PQ and PS ?



10. In figure, PQR is equilateral triangle with $PR=RQ=PQ=5$. If $PL=RN=QM=1$, what is the ratio of the area of the triangle LMN to the triangle PQR ?

