# 2008 Thailand Elementary Mathematics International Contest (TEMIC)

## Team Contest

2008/10/28 Chiang Mai, Thailand

***Team:* ___________________________ *Score:* ___________________**

**1.** $N$ is a five-digit positive integer. $P$ is a six–digit integer constructed by placing a digit ‘1’ at the right-hand end of $N$. $Q$ is a six–digit integer constructed by placing a digit ‘1’ at the left–hand end of $N$. If $P=3Q$, find the five-digit number $N$.

**ANSWER：** ____________________

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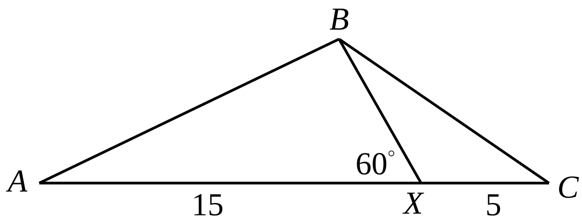
**2.** In a triangle *ABC*, *X* is a point on *AC* such that $AX$=15 cm, $XC$=5 cm, $\angle AXB$=60° and $\angle ABC = 2\angle AXB$. Find the length of *BC*, in cm.




**ANSWER：** ____________________ **cm.**

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**3.** A track *AB* is of length 950 metres. Todd and Steven run for 90 minutes on this track, starting from *A* at the same time. Todd's speed is 40 metres per minute while Steven's speed is 150 metres per minute. They meet a number of times, running towards each other from opposite directions. At which meeting are they closest to *B*?

**ANSWER**：____________________

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**4.** The numbers in group A are $\frac{1}{6}$, $\frac{1}{12}$, $\frac{1}{20}$, $\frac{1}{30}$ and $\frac{1}{42}$. The numbers in group B are $\frac{1}{8}$, $\frac{1}{24}$, $\frac{1}{48}$ and $\frac{1}{80}$. The numbers in group C are 2.82, 2.76, 2.18 and 2.24. One number from each group is chosen and their product is computed.

What is the sum of all 80 products?

**ANSWER**：_____________________

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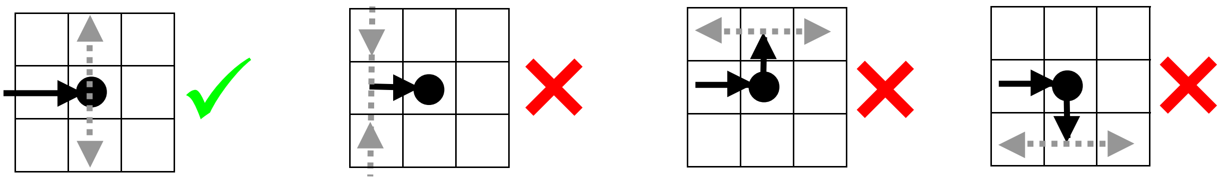
**5.** On the following 8×8 board, draw a single path going between squares with common sides so that

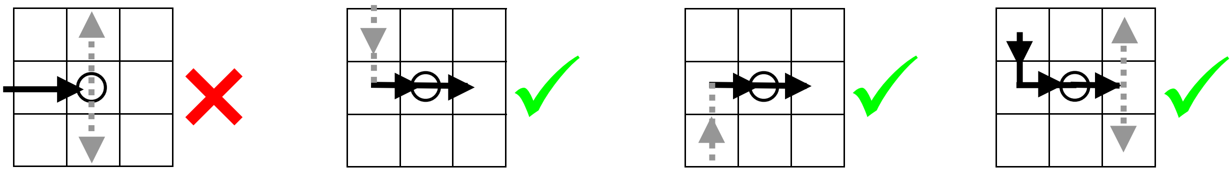
**(a)** it is closed and not self-intersecting;

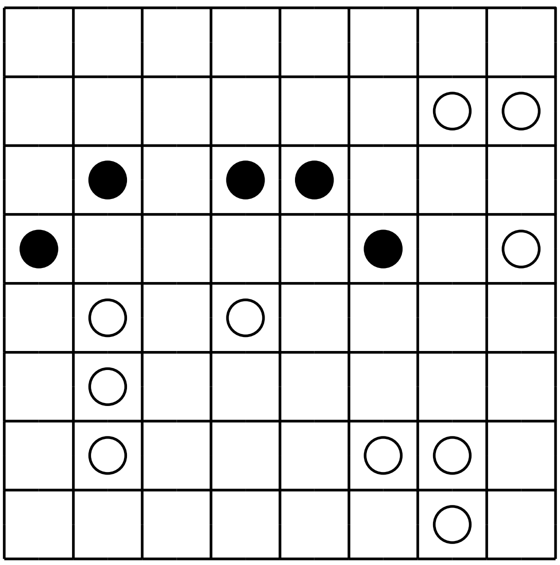
**(b)** it passes through every square with a circle, though not necessarily every square;

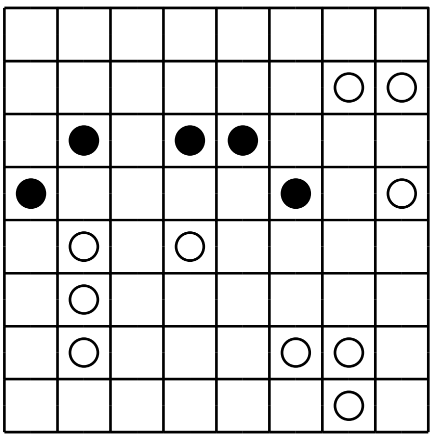
**(c)** it turns (left or right) at every square with a black circle, but does not do so on either the square before or the one after;



**(d)** it does not turn (left or right) at any square with a white circle, but must do so on either the square before or the one after, or both.







**ANSWER :** ______________________

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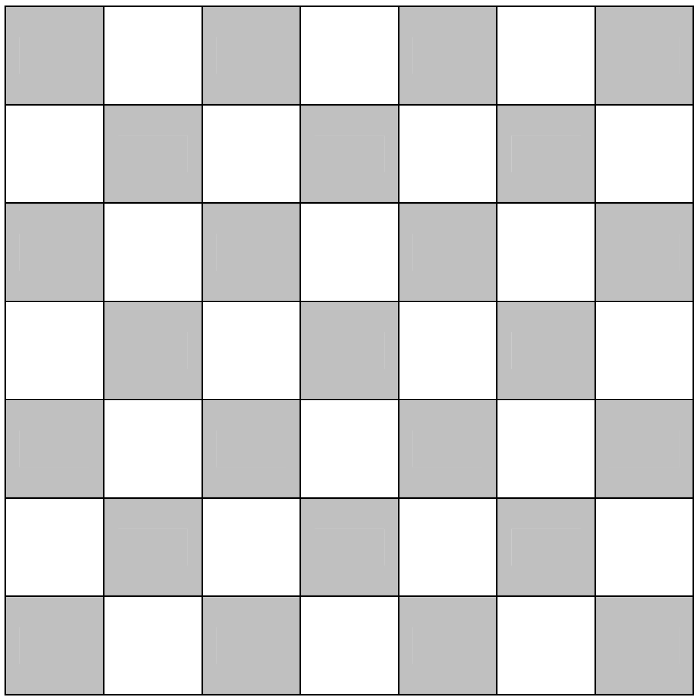
**6.** The diagram below shows a $7 \times 7$ checkerboard with black squares at the corners. How many ways can we place 6 checkers on squares of the same colour, so that no two checkers are in the same row or the same column?



**ANSWER**：__________________

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**7.** How many different positive integers not exceeding 2008 can be chosen at most such that the sum of any two of them is not divisible by their difference?

**ANSWER**：____________________

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**8.** A $7 \times 7 \times 7$ cube is cut into any $4 \times 4 \times 4$, $3 \times 3 \times 3$, $2 \times 2 \times 2$, or $1 \times 1 \times 1$ cubes. What is the minimum number of cubes which must be cut out?

**ANSWER：______________________**

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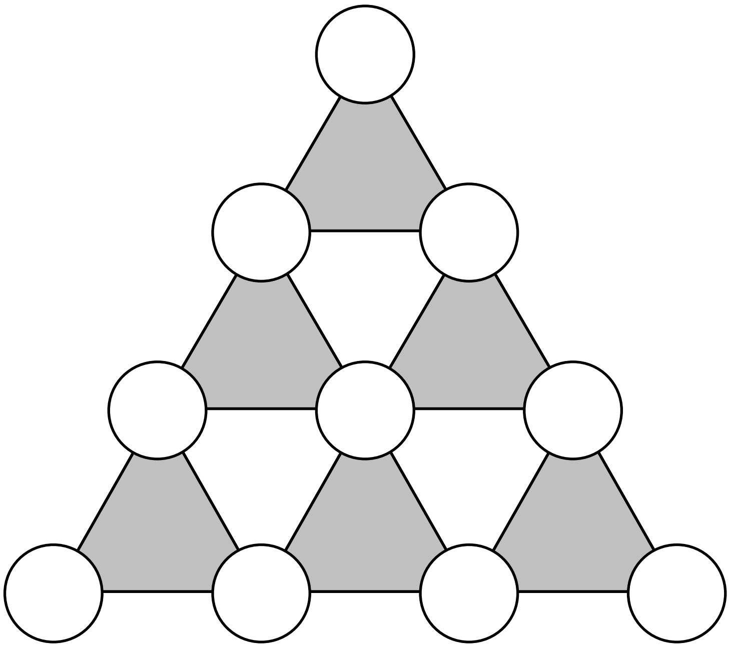
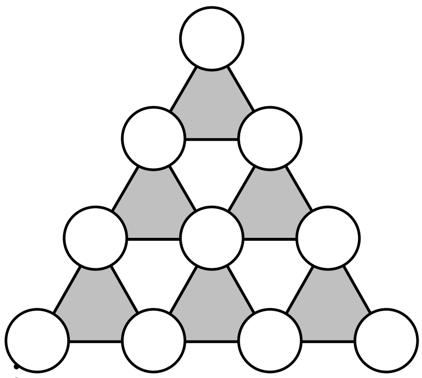
**9.** Place the numbers 0 through 9 in the circles in the diagram below without repetitions, so that for each of the six small triangles which are pointing up (shaded triangles), the sum of the numbers in its vertices is the same.





**ANSWER :** ____________________

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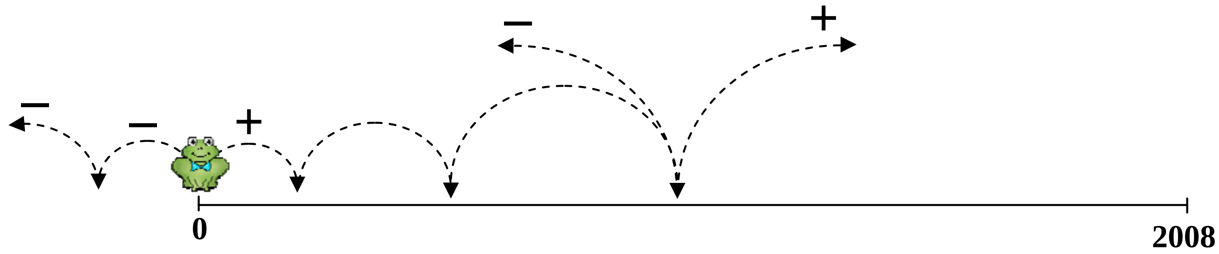
**10.** A frog is positioned at the origin (which label as 0) of a straight line. He can move in either positive(+) or negative(–) direction. Starting from 0, the frog must get to 2008 in exactly 19 jumps. The lengths of his jump are $1^2$, $2^2$, …, $19^2$ respectively (i.e. $1^{st}$ jump $=1^2$, $2^{nd}$ jump $=2^2$, . . ., and so on). At which jump is the smallest last negative jump?




**ANSWER：** ____________________