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Students of 7th class of primary school solve questions 1 to 3; students of 2nd and 3rd class of middle school from 1 to 5

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- A1.** A total of 60 pigeons sat on the left and right branches of a tree. After an hour, strong wind from the east blew and half the pigeons from the right branch flew to the left. After the next hour the wind changed direction and half of the pigeons from the left branch flew to the right branch. It turned out that there are as many birds sitting on each branch as at the beginning. How many pigeons sat at each branch in the beginning?
- A2.** Can any of the sides of the triangle be shorter than its shortest height?
- A3.** On the number line there is a flea that always jumps by one unit to the right or left. At the beginning, the flea is at point 0 and makes the first jump to 1. If the flea jumps on a number on which it has not been yet, it changes direction (for example, if the last jump went to the left, the next one is to the right). Otherwise, it goes in the same direction. Where will the flea be after 2018th jump??
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- A4.** Circles  $O_B$  and  $O_C$  with radii  $b$  i  $c$  respectively, are externally tangent circles and are placed on the same side of their common tangent line  $\ell$ . A circle  $O_A$  with radius  $a$  which is less than  $b$  and  $c$  is externally tangent to the circles  $O_B$  and  $O_C$  and to the straight line  $\ell$ . Show that  $\frac{1}{\sqrt{a}} = \frac{1}{\sqrt{b}} + \frac{1}{\sqrt{c}}$ .
- A5.** The number 234234234234... ends with a digit 2, 3 lub 4. Can this number be a square of a natural number?
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Solutions of the above tasks should be sent by a registered mail to the address:

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(dr Edyta Juskowiak)  
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by

**31st of January 2018**

(date as postmarked).

All solutions must be written down on separate one sided A4 sheets. The solutions may be submitted in Polish or English language. In the left, top corner of each sheet, the participant writes his/her first and second name and the school and class name. It would be good to add an e-mail address. Before submitting the solutions, please read terms and conditions of the WLMJ. With solutions please send your parents/guardian consent. It may be downloaded from the website. Before submitting the solution, please fill the form on our website.

All information (in polish language) about Greater Poland's Mathematical League for Juniors (WLMJ), including tasks and current ranking of participants may be found on:

<http://wlmj.wmi.amu.edu.pl>