

9th World Mathematics Team Championship 2018

Junior Level Individual Round 2

English Version

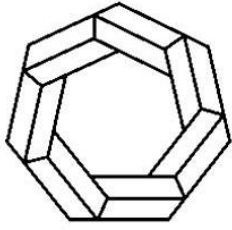
Instruction: This round has 8 questions (**40 minutes**).

Question numbers 1, 2, 3, 4, 5 and 6 are worth 4 points each.

Question numbers 7 and 8 are worth 8 points each.

No point penalty for submitting wrong answers.

1. Car with 4 wheels and 1 spare tire travelled for 1000 kilometers. Each of two of the tires has been used for 500 kilometers. The other three tires have been used equal number of kilometers. Find this number.
2. For how many positive integer values of a the 12 numbers
$$a, 1, 2^1, 2^2, \dots, 2^{10}$$
can be split into two sets of equal sums?
3. Six integers $x, x + 1, x + 2, x + 3, x + 4$ and $x + 5$ are such that the sum of any two of them equals to one of the remaining numbers or can be expressed as a sum of two or three from the remaining numbers. How many such x exist?
4. Find the number of three digit numbers such that the difference between any two neighboring digits is not 1.

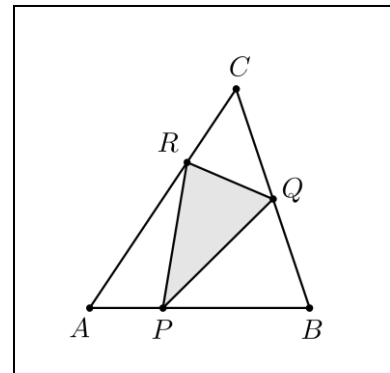


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5. We have 8 colors. Find the number of ways one can color the cells of 2×2 table such that no two adjacent cells are of the same color.

(A color may be used more than once. Two cells are adjacent if they share a common side.)

6. Points P , Q and R on the sides AB , BC and CA of triangle ABC are such that $AP:PB = 1:2$; $BQ:QC = 1:1$ and $CR:RA = 1:2$. If $S_{ABC} = 18 \text{ cm}^2$, find S_{PQR} .



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7. Find the number of solutions of $\frac{a}{b} + \frac{c}{d} = \frac{e}{f}$ where $a, b, c, d, e,$ and f are 1, 2, 3, 4, 5 and 6 in some order.
8. A person is born in year \overline{abcd} . A year \overline{mnpq} is good for that person if after his birthday his age in this year equals $a+b+c+d$. For example, 2017 is good for a person born in 2012. How many years are there between year 2000 and year 2018 inclusive that are not good for anyone?