Paraguay Mathematical Olympiad 2022

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1   There are 13 positive integers greater than $\sqrt{15}$ and less than $\sqrt[3]{B}$. What is the smallest integer value of B?

2   Santiago, Daniel and Fátima practice for the Math Olympics. Santiago thinks of a regular polygon and Daniel of another, without telling Fatima what the polygons are. They just tell you that one of the polygons has 3 more sides than the other and that an angle of one of the polygons measures 10 degrees more than one angle of the other.
From this, and knowing that each interior angle of a regular polygon of n sides measures $\frac{180(n-2)}{n}$ degrees, Fatima identifies what the polygons are. How many sides do the polygons that James and Daniel chose, have?

3   From a list of integers from 1 to 2022, inclusive, delete all numbers in which at least one of its digits is a prime How many numbers remain without erasing?

4   Karina, Leticia and Milena paint glass bottles and sell them as decoration. they had 100 bottles, and they decorated them in such a way that each bottle was painted by a single person. After the finished, they put all the bottles on a table. In an oversight one of them pushed the table, falling and breaking exactly $\frac{1}{8}$ of the bottles that Karina painted, $\frac{1}{3}$ of the bottles that Milena, painted and $\frac{1}{6}$ of the bottles that Leticia painted. In total, 82 painted bottles remained unbroken. Knowing that the number of broken bottles that Milena had painted is equal to the average of the amounts of broken bottles painted by Karina and Leticia, how many bottles did each of them paint?

5   In the figure, there is a circle of radius 1 such that the segment AG is diameter and that line AF is perpendicular to line DC. There are also two squares $ABDC$ and $DEGF$, where B and E are points on the circle, and the points A, D and E are collinear. What is the area of square $DEGF$?
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