

## Class Description: Middle School Competition Math

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This Mathematics course, designed for middle school students, will help students develop and enhance their problem solving skills. We will use previous AMC 8 (American Mathematics Contest 8), MATHCOUNTS problems for class examples and homework.

We will talk about the basic knowledge, properties and theories needed to do homework, as well as strategies to efficiently solve these problems. Typically, weekly homework consists of 8 problem, 5 of which are challenging enough for 6<sup>th</sup> and 7<sup>th</sup> grade students to solve, and 3 for 8<sup>th</sup> grade students.

This course covers the major areas of middle school math — Algebra, Geometry, Number Theory, Counting and Probability. Below are 8 sample problems.

1. What is the least positive integer divisible by the four smallest odd, positive integers?
2. In Mathopolis, an *adult* is a person 21 years of age or older and a *child* is a person under 21 years of age. Exactly half of the adults in Mathopolis are female, and exactly half of the female adults have exactly one biological child. Nobody else has a child, and there are no other children. What percent of the people of Mathopolis are children?
3. What is the smallest positive integer that is a perfect square and is also a sum of six consecutive positive integers?
4. If  $x$  is a positive integer, what is the value of  $x$  for the equation  $(x! - (x-3)!) \div 23 = 1$ ?
5. Line  $m$  has the equation  $y = 3x + 5$ . Line  $n$  has the equation  $y = kx - 7$ . Lines  $m$  and  $n$  intersect at the point  $(-4, -7)$ . What is the value of  $k$ ?
6. What is the area of the convex quadrilateral with vertices  $(-1, 0)$ ,  $(0, 1)$ ,  $(2, 0)$  and  $(0, -3)$ ?
7. When  $x^2 - 5x + 3c$  is divided by  $x - 3$  the remainder is  $-12$ . What is the value of  $c$ ?
8. For what base,  $b$ , is  $14_b + 24_b = 41_b$  true?