Types of math problems that will be covered on IPoly's math entrance exam (the test covers content taught up to the 8th grade, 1st semester level)

- Generate and analyze patterns; generate a number or shape pattern that follows a given rule.
- Write and evaluate numerical expressions involving whole-number exponents.
- Evaluate expressions at specific values of their variables.
- Apply the properties of operations to generate equivalent expressions.
- Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
- Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
- Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
- Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers.
- Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers.
- Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
- Use proportional relationships to solve multistep ratio and percent problems.
- Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used.
- Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b.
- Solve linear equations in one variable.
- Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions.
- Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
- Analyze and solve pairs of simultaneous linear equations.
- Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations.
- Solve real-world and mathematical problems leading to two linear equations in two variables.
- Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π2).
- Understand that a function is a rule that assigns to each input exactly one output.
- Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
- Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.
- Construct a function to model a linear relationship between two quantities.