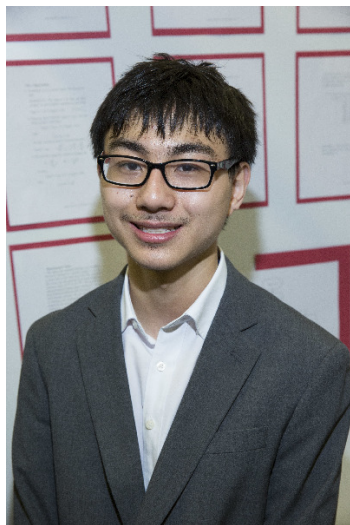


# CWSF 2014 - Windsor, Ontario



## William Zou

### New Algorithms for Approximating Logarithms With k-th Order

**Challenge:** Innovation

**Category:** Senior

**Region:** York

**City:** Markham, ON

**School:** Pierre Elliott Trudeau H.S

**Abstract:** Computers can only add, subtract, multiply and divide. This makes it difficult for them to calculate fundamental functions such as logarithms. The Taylor Series is an effective algorithm to approximate their values. The ability to control the error is of importance. Through various algebraic manipulations, various algorithms for approximations of log functions were constructed and compared to the original method through test values.

#### Biography

I am a Grade 11 student at Pierre Elliott Trudeau High School. My favorite subject is mathematics. Recently I began investigating practical applications of the subject into the real world. After investigating the y-cruncher pi-program and the Chudnovsky algorithm, I became interested in scientific accuracy. The Mercator Series converges to the actual value at a very slow rate, and I began brainstorming ideas to create a faster method. For future investigations, I plan to attempt setting the world record for the fastest computation of the natural logarithm of 2, thus comparing my algorithm with other modern methods. I love teaching, and co-founded an academic club at my school. I am also an AP Scholar, and was invited to write the Asian Pacific Math Olympiad in 2013. For other students thinking about doing a project, I would advise them to play to their strengths.

#### Awards

#### Value

Excellence Award - Senior - Bronze Medal Sponsor: Nuclear Waste Management Organization	\$100
University of Ottawa Entrance Scholarship Senior Bronze Medallist - \$1000 Entrance Scholarship Sponsor: University of Ottawa	\$1 000
Western University Scholarship Bronze Medallist - \$1000 Entrance Scholarship Sponsor: Western University	\$1 000
<b>Total</b>	<b>\$2 100</b>